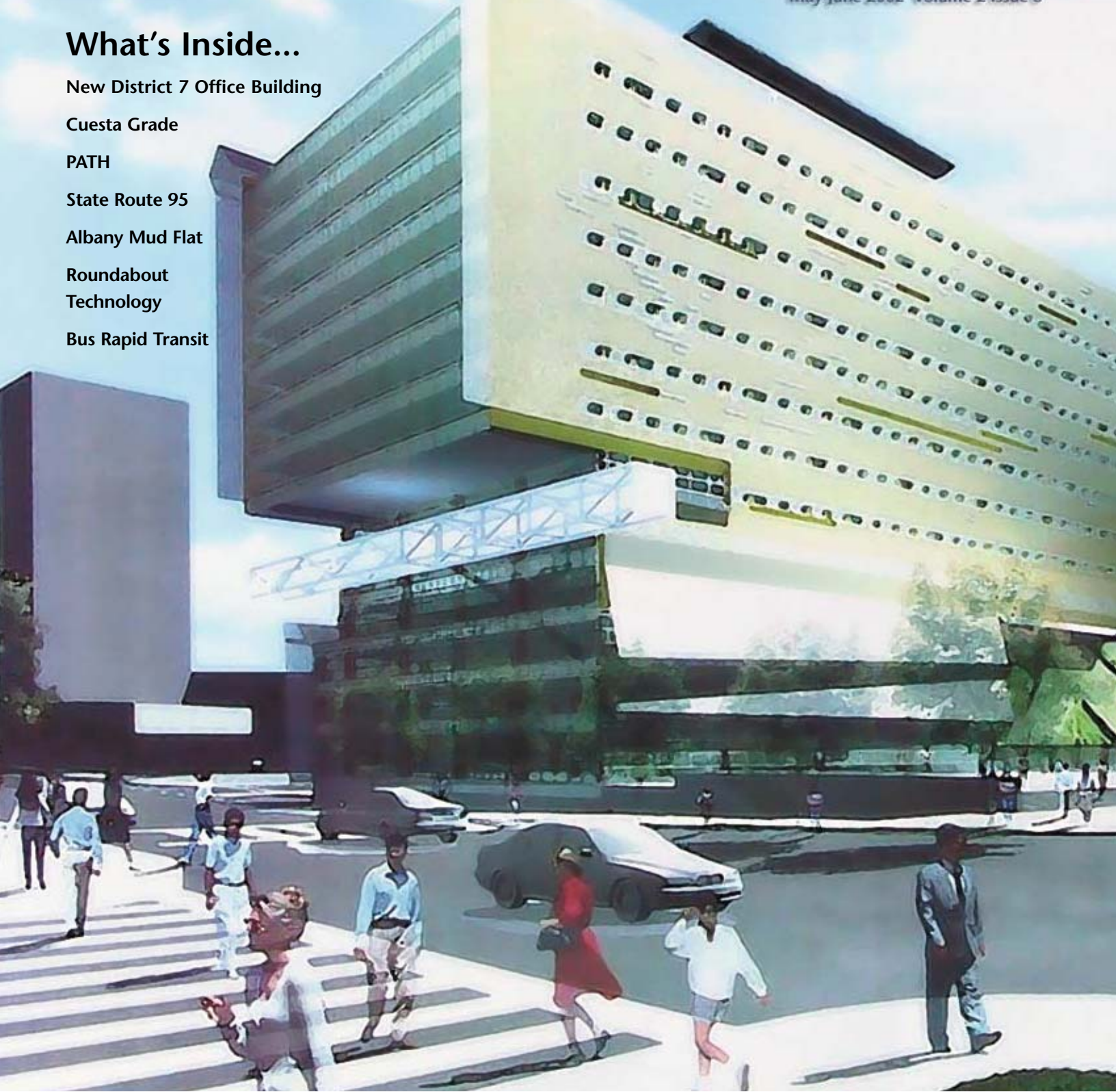
CALIFORNIA DEPARTMENT OF TRANSPORTATION

Journal

May-June 2002 Volume 2 Issue 6

What's Inside...



Gray Davis
Governor

Maria Contreras-Sweet
Secretary of the Business, Transportation and Housing Agency

Jeff Morales
Director of the California Department of Transportation (Caltrans)

Dennis Trujillo
Deputy Director External Affairs

Gene Berthelsen
Editor

Photography
Caltrans

Art Direction / Design
Page Design, Inc.

Printing
Office of State Publishing

Cover Illustration:
Morphosis

For individuals with sensory disabilities, this document is available in Braille, large print, on audio-cassette, or computer disk. To obtain a copy in one of these alternate formats, please call or write to:

Caltrans Public Affairs Office
1120 N Street,
Room 1200
Mail Stop 49
Sacramento, CA 95814
(916) 653-5456
(916) 653-4086 (TTY)

Letter from the Director

Last month, Californians voted by a margin of better than two to one in favor of Proposition 42, which will mean that all revenues collected from the sales tax on gasoline will now be used for transportation purposes. As a practical matter, this makes permanent the funding change enacted through Governor Gray Davis' Traffic Congestion Relief Program. The governor's early support of the measure helped secure its approval by voters.

With passage of Proposition 42, Californians have again said that they want to see transportation improvements continue. Voters have provided additional resources and, in effect, have told us and our various partners that they expect to see results. This is consistent with the results of an external survey we conducted last year, in which those sampled generally said that they were not only satisfied with the department's performance in delivering transportation services, but that they would assign us an even more active role if given the chance. With Proposition 42, the voters reaffirmed that support and, at the same time, raised the bar on expectations. At Caltrans, we must continue to meet the challenge.

During its first 20 years, this constitutional amendment is projected to deliver $35 billion for transportation purposes. On average, that's more than $1.5 billion annually, over and above the record transportation investment — in constant dollars — that we are making now. Almost two-thirds of those funds will go for investments in new transit and roads.

Jeff Morales

Beginning in 2003-04 and continuing through 2007-08, the funds will be used for projects outlined in Governor Davis' Traffic Congestion Relief Plan, the State Transportation Improvement Program, Public Transit Account and for maintenance of local streets and roads. The governor's unprecedented $5.3 billion program was the first commitment of the gasoline sales tax for transportation purposes.

Beginning in 2008-09, the funds will be allocated as follows:

- 20 percent for public transit and mass transportation
- 40 percent for the State Transportation Improvement Program
- 20 percent for city road maintenance
- 20 percent for county road maintenance

As for the state's share of those funds, we have three priorities for their use: congestion relief, congestion relief and congestion relief. And we are making real progress. So far, 135 Traffic Congestion Relief Program projects worth more than $3.5 billion have been fully or partially approved and we expect to receive the six remaining applications before the end of the fiscal year.

In a single day, February 28, we started pushing dirt on three major projects funded by the program. As you read this issue of the Journal, you'll see in our progress report on the Governor's program that many more projects will break ground this summer. I am enormously proud of the team that has kept the Governor's promise. Each of those projects helps take congestion off our highway system, keep commerce flowing and move travelers to their destinations.

As the department's portion of the funds from Proposition 42 flows through our system, I fully expect that we will be just as effective in putting those funds to work.

Jeff Morales

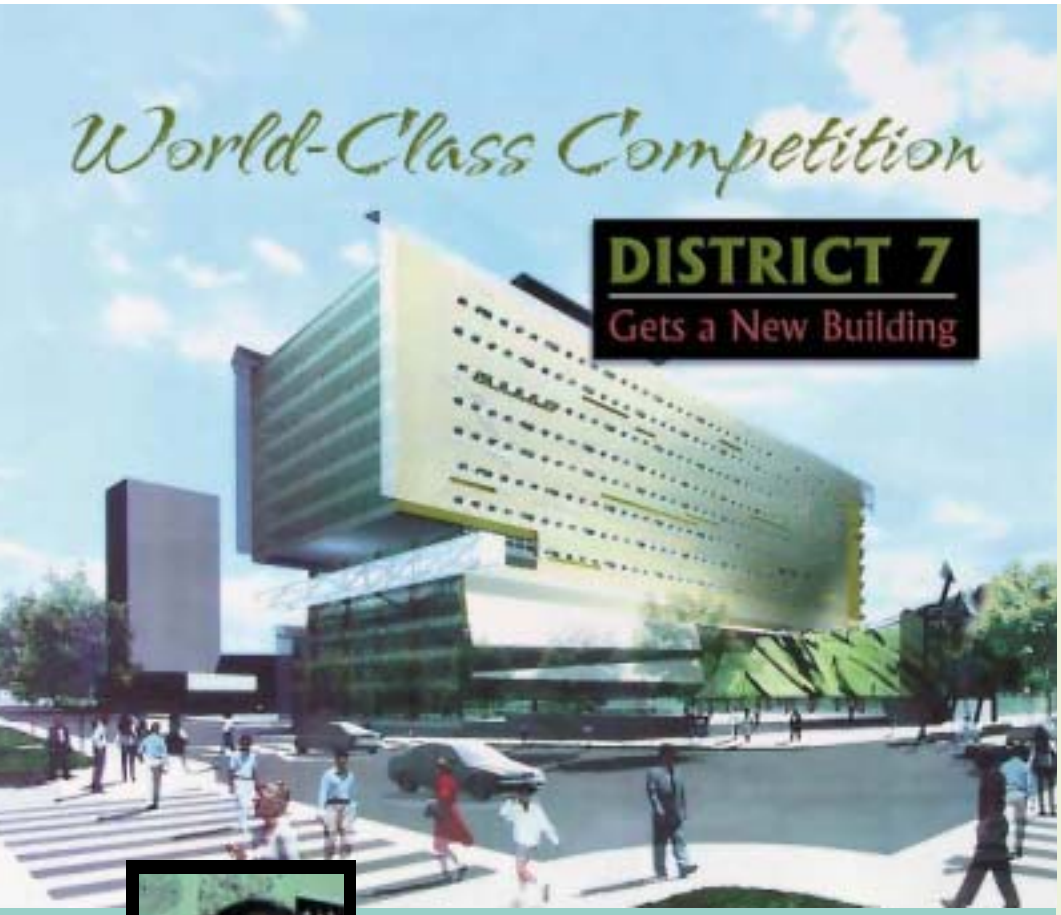
CALIFORNIA DEPARTMENT OF TRANSPORTATION

Journal

MAY-JUNE 2002 VOLUME 2 • ISSUE 6

World-Class Competition

DISTRICT 7 Gets a New Building



Maria Quiñonez

Maria Quiñonez is a 19-year veteran of construction wars in perhaps the most challenging fishbowl anywhere in the Los Angeles Basin. Her experience includes picking up the pieces of the 1994 Northridge Earthquake and the recent Route 14 HOV project. Later, she was in charge of four construction field offices, with a staff of 22 construction engineers and support staff.

But today, Maria Quiñonez has a job that makes those earlier ones look like a piece of cake. She is the manager of a project to get a new, $190 million headquarters office building for Caltrans District 7 up and operating by October 2004. The new building will be located across the street from the old one, in the block between 1st, 2nd, Main and Los Angeles streets.

Asked about her personal goal for the project, Ms. Quiñonez merely says, "I want 66 535 m² of office space and 1,142 parking spaces in operation before they demolish the old Caltrans building at 120 South Spring Street. And that starts on January 1, 2005."

A walk through the old building tells why 120 South Spring is coming down. The current office building and annex, completed in 1949 and 1960, respectively, were severely damaged in the Northridge quake and there are alarming-looking, visible cracks in various places. But that's not all. The old building doesn't have enough space, it is obsolete for offices in a cybernetic universe, there are fire and safety problems and deficiencies in handicapped accessibility. And besides, it just doesn't feel like a very nice place to work. Three years from now, a public park will replace it.

Following a worldwide architectural beauty contest, the design of the new building was awarded to architect Thom Mayne of Santa Monica-based Morphosis, which has been given the task of producing a world-class design that emphasizes architectural artistry, environmental harmony and "functionality," a feature that is particularly important to Maria Quiñonez.

"I'm most concerned about the workspaces and the juxtaposition of the various organizations within the building," Quiñonez says. "We're planning a state-of-the-art working space, with the building fully wired for all the engineering needs that we can anticipate for the next 60 years." Quiñonez spends a lot of time on the "stacking plan," the schematic diagram showing where people will be located on the building's 13 floors.

Mayne has earned a reputation for work that addresses social themes and urban issues in stripped-down forms. Some of his recent projects and proposals include a Los Angeles elementary school under a landscaped berm and a San Francisco office building without air conditioning. He is a finalist for the renovation and expansion of the Los Angeles County Museum of Art.

> *"Design is important, but what's more important is that our people have a place that works for them."*
>
> *-Maria Quiñonez*

His new Caltrans building certainly emphasizes architectural artistry. Its most dramatic feature is a "scrim" that sheathes the entire east and west faces of the building. The scrim, made of a metal mesh, has the purpose both of shielding windows from direct sunlight and providing a winglike façade that keeps viewers mindful of its occupants' efforts to keep Los Angeles on the move. The scrim, more properly called a "hypobark," will be outfitted with 2,000 panels (Quiñonez refers to these as "flappies") that move in relation to the sun, allowing its light but not its heat to enter the building.

The scrim is a signature element of many Mayne buildings constructed around the world.

The new building will overlook a plaza donated by developer/businessman Eli Broad, who has been involved in several Los Angeles architectural competitions and has a keen interest in downtown development. "The city needs more world-class architecture," Broad says. "I'm hopeful that this will set a pattern for other major public buildings."

The new building will also house an adjunct to the traffic management center run jointly by Caltrans and the County and City of Los Angeles and other operators, and may include space for a number of private eateries being displaced by the new building, including the world-famous Kosher Burrito. It will accommodate 1,142 parking spaces — 300 of which are for the district's vehicle fleet and 210 for the Los Angeles Department of Transportation, an issue which, today, has Quiñonez on the run, fighting to get the spaces properly sized for the larger vehicles. Because the building is being designed by means of a design-build contract, myriad details have to be worked out as the project moves along. This is different from the kind of construction supervision Quiñonez is used to. "Ordinarily in construction," she says, "you get a set of plans and you go to work. If there's a problem, you deal with it in the field, make changes and you go on. But on this project, we have an overall concept and we still have to flesh out the structural details." And so, with the groundbreaking a few days away, she is off to attend a meeting to go over differences in the size of the spaces.

A large contingent of District 7's staff gathers in the parking lot that in two years will accommodate their new home.

Main and First Design/Build Associates, the designer-builder, is overseeing the construction project. The consortium consists of Clark Construction Company; Morphosis, Design Architect; Gruen Associates, architect of record; and Urban Partners, Public Agency Facilitator. Others involved in the project include A. C. Martin Partners, technical support, and O'Brien-Kreitzberg-URS, construction project manager.

"We are extremely pleased with our agreement with the design/build firm," says Secretary Maria Contreras-Sweet of the California Business, Transportation and Housing Agency. "With this accomplished, we can soon begin work on a project that will be a source of pride to everyone associated with it, as well as a primary contributor to the increasing vitality of downtown Los Angeles."

District 7 first began exploring a new building in the mid-1970s, but funding constraints, political vicissitudes and changes in environmental requirements kept the project on the back burner until the Davis administration took office in 1998. Contreras-Sweet has been heavily involved in the project since the day she walked into the old building to find that elevators were not working and saw cracks in the plaster as she walked up four flights of stairs to the District Director's office. "It didn't take long to recognize that something needed to be done here, and I'm proud to have taken a hand in getting this project moving," Contreras-Sweet says.

District 7's eye-catching architecture will have some pretty hefty competition, including Frank Gehry's ambitious Disney Hall for the performing arts and a new Los Angeles cathedral by Spanish architect Jose Rafael Moneo. "Governor Davis wanted this building to be an important piece of architecture rather than just another office building," Contreras-Sweet says. "I'm hopeful that this will set a pattern for other major public buildings."

But Maria Quiñonez is less concerned with soaring architecture than how well the building meets Caltrans' needs as a place to work and whether it meets state standards adopted last year that demand more environmentally friendly structures. "Design is important, but what's more important is that our people have a place that works for them," she says.

And with that goal in mind, she is off to increase the size of those parking spaces for the district's vehicles.

— Gene Berthelsen

By Steven DeVorkin, Television Specialist, District 7 External Affairs

My dad worked in downtown Los Angeles for almost 30 years. In all that time he never spoke of the glory that is City Hall or the grandeur of the marbled Music Center. The gingerbread mansions of Bunker Hill were an eyesore and even the famed Angel's Flight tram near Bunker Hill was dismissed as mere public transportation.

In a world of famous downtown eateries such as Vickman's (fabulous breakfast at four in the morning), the Pantry (huge steaks and surly waiters), Phillipe's (French dip), Cole's (the *other French dip*), Langer's (Pastrami) and even Mike's Hockey Burger (a puck with everything on it) — the one place he rhapsodized about was the home of the "kosher burrito".

What is a "kosher burrito" you may ask? You might if you are among the three or so people in downtown who have not teased their taste buds with this delectable concoction.

So let me introduce you to it with this fond remembrance by a former District 7 employee, Russell Snyder, now in exile in Sacramento.

"The Kosher Burrito is a whimsical metaphor for the polyglot that is Los Angeles. There is certainly no rabbinical supervision at this grill, which is often staffed by Asian and Latin-American immigrants. No matter. Where else can you get such greasy, gooey goodness in the form of a burrito with a heart of corned beef and enough spices to make you shout?"

"The Kosher Burrito ranks up there with the Apple Pan burger joint on Pico Boulevard and the dear, departed La Barbara's pizzeria on Wilshire Boulevard in the ranks of legendary Los Angeles eateries."

Let's now toast the Kosher Burrito with antacids raised high, as we switch hyperbolic gears from revelry to reality.

Vickman's is history. The mansions on Bunker Hill are history. The Music Center is in danger being eclipsed by Disney Hall. My dad is now history and suddenly we hear that, in the near future, the Kosher Burrito will be history as well, to make way for our future state-of-the-art building.

But must this be the end of the Kosher Burrito? We at Caltrans feel that same bittersweet taste of personal sacrifice that others have felt when a freeway goes through. It hurts, but we know it is for the greater good. We have been waiting years and we desperately need a new district office building, which is part of the plan for revitalizing downtown.

A source deep inside Caltrans says there is the hope that the Kosher Burrito can live long and prosper and we can have a new building, too. There is word that there might be a place in the new building for a new and improved Kosher Burrito. I hope that there will be a Kosher Burrito for us and future generations to come.

They saved Angel's Flight; City Hall's Lindbergh light shines brightly again and the gewgaw mansions of Bunker Hill are on view in a mythical place called Pasadena.

Will the Kosher Burrito survive to fuel future generations of heartburn to come? I'm saving my antacids and keeping my grease-stained fingers crossed.

GOVERNOR'S

TRAFFIC CONGESTION RELIEF PROGRAM

MAJOR SAN DIEGO INTERCHANGE BREAKS GROUND

San Diego is an unlikely spot to be ground zero in the war against traffic congestion.

Yet, it is here — on Interstate 5's interchange with Interstate 805 in the Sorrento Valley north of San Diego — that the battle has been joined by Governor Gray Davis' Traffic Congestion Relief Program.

The numbers are mind-boggling. In 15 years, traffic on Interstate 5 north of San Diego has more than doubled to nearly a quarter million vehicles a day. Afternoon rush-hour backups through the Sorrento Valley routinely stretch six kilometers.

It is here, at what local wags call the "mother of all bottlenecks," that motorists are seeing help in the form of a $182 million congestion-relieving project that includes widening the freeway to 16 lanes.

"Thanks to the Traffic Congestion Relief Program, the funding was provided to get this project moving. Without it, there would be no work underway and the prospect for thousands of travelers on Interstate 5 would have been bleak," says Pedro Orso-Delgado, Caltrans District 11 director.

On February 28, Governor Gray Davis joined local and state officials in launching this major improvement project.

The $6.8 billion Traffic Congestion Relief Program, unveiled in June 2000, is the largest general fund investment ever made for transportation in California history.

"The importance of the governor's program to this project cannot be overstated," says Arturo Jacobo, project manager for the I-5/I-805 widening project.

An infusion of $25 million from the TCRP allowed the work to be consolidated and move forward to construction.

"When completed, the facility will be able to handle the year 2015 traffic volumes," Jacobo says.

With the financing issue resolved, the job for more than 150 Caltrans engineers, environmental staff and right-of-way agents was to get the project designed, approved and ready for construction. Keeping traffic moving, while protecting the environment and addressing the unique concerns of the surrounding businesses and residents, are the continuing challenge as construction moves forward.

"Managing traffic is a balancing act. As part of our traffic management plan, major construction is scheduled for off-peak hours and at night, to keep the existing number of lanes open to traffic," Jacobo says.

The Sorrento Valley is San Diego's high-tech hub; the presence of so many cyber businesses presented a unique construction challenge for Caltrans. Many of them use sophisticated equipment that is highly sensitive to vibration. To address that, Caltrans engineers instituted a monitoring process to calibrate the vibration as thousands of piles are being driven and to adjust the work schedule to keep the vibration within acceptable levels.

The project includes adding three lanes in each direction, including a carpool lane, to the existing four lanes on southbound Interstate 5, widening the interchange at Interstate 805 and building a new interchange at Carmel Mountain Road.

In addition, the interchange will be strengthened to withstand a magnitude 7.0 earthquake on the Newport-Inglewood-Rose Canyon fault.

The new northbound lanes will be open to traffic in 2005 while the remainder will be completed in the spring of 2007.

On the same day Governor Davis launched the San Diego project, another congestion-relieving improvement — the Highway 85/101 South interchange project in San Jose — got underway. The local Valley Transportation Authority tax measure project will provide high-occupancy-vehicle direct connectors between two bottlenecked corridors in the growing south Bay Area, completing more than 60 km of continuous HOV lanes between Morgan Hill and Redwood City.

The project also includes a mixed-flow connector from southbound Highway 101 to northbound Highway 85 to complete the interchange. The Governor's Traffic Congestion Relief Program provided $25 million—the largest TCRP construction allocation to date in Northern California—to complete the Highway 101 widening up to and including the improved interchange.

"Managing traffic is a balancing act. As part of our traffic management plan, major construction is scheduled for off-peak hours and at night, to keep the existing number of lanes open to traffic," Jacobo says.

Also on February 28, the California Transportation Commission approved nearly $74 million for six additional TCRP projects.

The funds will finance highway, rail and marine improvements in Los Angeles, the San Francisco Bay Area, San Diego, the Central Valley and Sacramento. With this action, 136 of the 141projects in the Governor's Traffic Congestion Relief Program totaling more than $3.5 billion (approximately 72 percent) have now received funding.

The latest projects receiving funding include:

$40 million to construct a high-tech managed lane on Interstate 15 between Highway 163 and Highway 78 in San Diego. The lane is intended to maximize the operating efficiency of the freeway by carrying in-bound commute traffic in the morning and out-bound traffic in the afternoon. Fixed concrete barriers would separate the managed lane from the other traffic with access openings at three to five kilometer intervals;

$23 million to build a new four-lane road to connect Highway 99 and Bellevue Road east of the city of Merced. The new Campus Parkway, which could be modified to six lanes, would serve traffic in the rapidly growing area east of Merced;

$5 million for additional track work to provide improved access for Metrolink and Pacific Surfliner trains to Los Angeles' Union Station. The new tracks would provide more flexibility for both Metrolink and Amtrak trains using Union Station;

$3.9 million to double-track the light rail line running along Interstate 80 in Sacramento County. This project will allow Sacramento Regional Transit to run trains at higher speeds along this section of track, reducing travel time between downtown Sacramento and the city's eastern suburbs;

$884,000 to acquire a low-emission, high-speed ferryboat to operate between San Diego and Oceanside. The ferry would offer an option for travelers currently using Interstate 5 between San Diego and North County;

$1 million to perform an environmental study in preparation for construction of grade separations for Caltrain in San Mateo County. This project would eliminate the backup of vehicles that currently wait for trains to pass and reduce the potential for accidents caused by vehicles or pedestrians crossing in front of approaching trains.

THE MONEY AT WORK

Governor Gray Davis and Caltrans officials

Completed Projects:

Coaster Commuter Rail - acquire new locomotive in San Diego County
West Hollywood repair on Santa Monica Boulevard in Los Angeles County

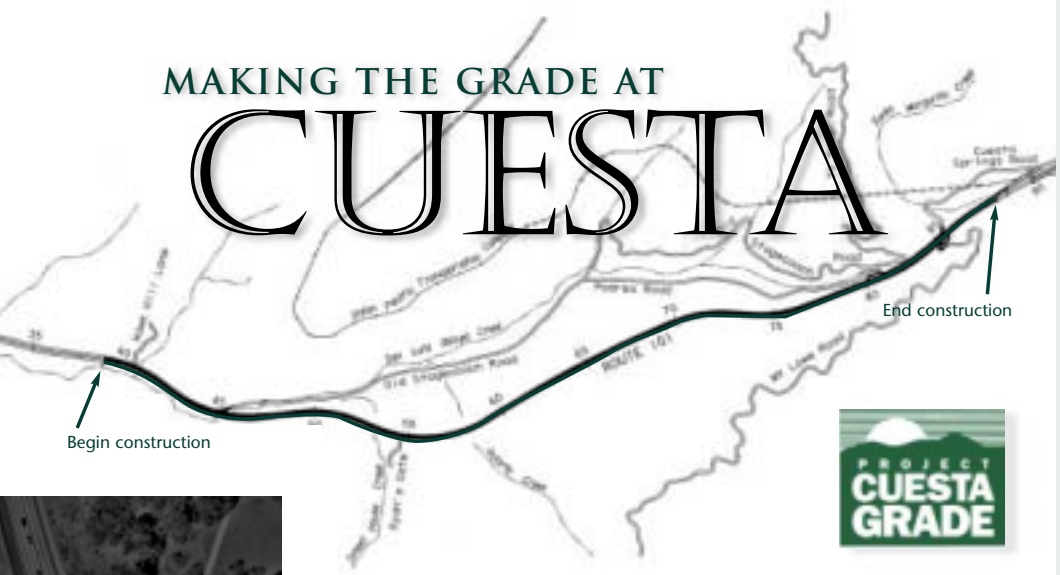
Projects Under Construction or in Procurement:

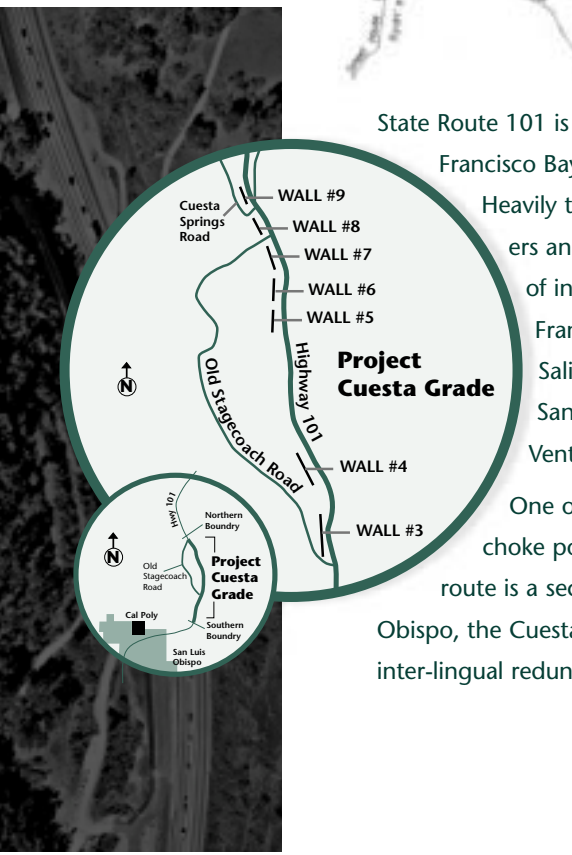
Rte 101 - widen freeway, improve Rte 101/85 Interchange - Santa Clara County
Harder Road Overcrossing, Capital Rail Corridor - Alameda County
Acquire rolling stock, Caltrain Peninsula Corridor - San Francisco/San Mateo/Santa Clara counties
HOV lane, Route 101 in San Rafael - Marin County
Third Street Rail Extension, SF Muni in the City of San Francisco
Ocean Avenue Light Rail, SF Muni in the City of San Francisco
Fuel cell buses and fueling facility for AC Transit - Alameda and Contra Costa counties
Los Angeles to Pasadena Blue Line - Los Angeles County
Construct soundwalls, Route 22 - Orange County
Reconstruct and widen Route 5/805 interchange - San Diego County
Clean diesel program, Emergency Clean Air District - San Joaquin Valley
Low-emission buses, Santa Cruz Metropolitan Transit District bus fleet
State Street Smart Corridor - Santa Barbara County
Folsom Light Rail - El Dorado County

Clean diesels, Sacramento Emergency Clean Air/Transportation Program- Sacramento County
Low emission buses, Sacramento Regional Transit - Sacramento County
Route 85/Route 87 Interchange - Santa Clara County
Route 50/Sunrise Boulevard Interchange - Sacramento County
Balboa Park BART Station; phase I expansion - San Francisco County
Golden Gate Bridge seismic retrofit - San Francisco and Marin Counties
Widen Route 98 in the City of Calexico in Imperial County
Low-emission express buses, Santa Cruz Metropolitan Transit District - Santa Cruz County
Remodel, install new signals at Olympic Blvd/Lemon Street intersection - Los Angeles County

Currently, more than two dozen projects are in the pipeline for groundbreakings over the summer and fall.

MAKING THE GRADE AT CUESTA





State Route 101 is a crucial link between the San Francisco Bay Area and the Los Angeles Basin. Heavily traveled by trucks, business travelers and tourists, it has a high percentage of inter-regional travel, serving the San Francisco-San Jose conurbation, Salinas-Monterey, San Luis Obispo, Santa Barbara, and the Los Angeles-Ventura urban area.

One of the most severely constricted choke points of this vital inter-regional route is a section lying just north of San Luis Obispo, the Cuesta Grade (a splendid example of inter-lingual redundancy that means "Grade grade").

Even in its fourth or fifth incarnation (earlier ones included the original Indian trail, a stage road, a two-lane highway, expansion to four lanes and a realignment), the 4.8 km section of SR101 known as Cuesta Grade is a narrow, curving, four-lane highway with minimal shoulders and a seven percent incline. It is traversed by almost 4000 trucks daily that inch upward and brake downward at 50 km/h, producing immense differentials in speed between them and the passenger cars that whip along at more than 100 km/h. It is a recipe for accidents and for long lines of vehicles chugging laboriously over the top of the grade, particularly in high-volume summer months or on holiday weekends.

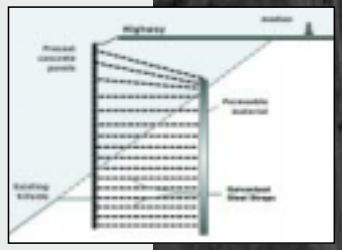
The road also had a nagging problem of soil instability in a portion of the grade that resulted in District 5's maintenance forces, over time, having to place as much as five meters of hot mix in an area where the road was settling.

State Route 101's popularity as an inter-regional route—almost 50 000 vehicles daily on a major holiday—meant two things: first, in 1988, the San Luis Obispo Council of Governments identified a high-priority project to make major improvements in the grade's geometrics. Secondly, while the department made those improvements, it had to keep the flow of travel as free as possible.

Caltrans and its contractors, Modern Continental/Roadway Construction, began the $46 million project in the fall of 1999 and are expected to finish in the fall of 2003.

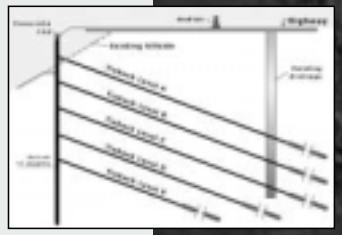
Tim Campbell, a 12-year veteran of Caltrans construction, is the Resident Engineer on the job. His previous experience includes work in District 7 after the Northridge Quake, realignment of Route 41 near Paso Robles, restoration of Route 1 south of Big Sur after El Nino, and removing the last signals on Route 101 between San Francisco and Los Angeles on the Santa Barbara Crosstown Freeway.

"This is a big, complex job," Campbell says. "Because the highway clings to the sidehill of the Cuesta Ridge, improvements to the section's geometrics necessitate moving almost 250 000 m^3 of the more than 450 000 m^3 of material from the excavations on the uphill side of the highway to fill slopes on the downhill side. There are no over- or undercrossings in the project reach. Trucking that much dirt up and down a 7 percent grade to get it



Mechanically stabilized embankment retaining wall

Tieback wall



Tim Campbell, Questa Grade Project Resident Engineer

The steep terrain and narrow workspace put construction activity within a few meters of busy traffic.

(cont. from page 13)

the majority of work to occur without lane closures. During construction, lane closures are required only for phase changes and none are allowed during peak hours and high-travel holiday weekends.

"This has been very tight all the way through," Campbell says. "There have been many challenges along the way. Design, Environmental, Geotechnical and Traffic work really well together as a team to come up with solutions to some very difficult situations that the project imposes."

Because construction would require a reduction from two lanes to one in each direction at various times, the district developed a $720 000 public information contract to provide information about potential disruptions both to local travelers and to those traveling through. The contract was awarded to Barnett, Cox and Associates, a San Luis Obispo communications firm.

The communication program included developing an identifying symbol for the project, collaborating with large businesses and local ridesharing programs, working with area media and creating a campaign of spot announcements to let travelers over the grade know of upcoming disruptions. A towing service, engaged for the duration of the project, gets incidents off the highway as quickly as possible, resulting in traffic flow that is sometimes even freer than it was before the job started. The project also uses a COZEEP unit. The communications firm meets monthly with all project personnel, including construction, design, right of way, traffic ops, the California Highway Patrol and rideshare organizations.

The public awareness campaign has been so successful that when it became necessary to close Route 101 to construct a temporary bridge across the highway, traffic approaching the site dropped to virtually nothing before the closure; the actual closure, which lasted for five hours, went without incident.

On several occasions, members of the project staff have seen mountain lions, bear and other large predatory animals. The project also included construction of fish passage weirs in an existing large culvert carrying San Luis Obispo Creek to facilitate the movement of steelhead salmon upstream where none had previously been observed. However, during the construction phase, an upstream discovery of a steelhead put a temporary halt to construction while the National Marine Fisheries Service was consulted. Work soon resumed at an accelerated pace.

The project will offer first-time benefits for bicyclists, who historically have had to contend with extremely narrow shoulders next to high-speed traffic. Due to the narrow lanes and shoulders during construction, special detours for bicyclists were put in place, using a combination of side roads, signs and concrete barriers. The completed project will present bicyclists with ample shoulders throughout the length of the project, as well as bike trails that offer a route separated from cars and trucks. Bicycle commuters tough enough to face the steep climb will find their trip much more pleasant with these improvements.

Like any major construction project, this one has not been without its problems, including encountering ground water where it had not been anticipated, erosion from sudden downpours, landslides, occasional traffic problems, lead removal, steel shortages and the discovery of crude oil and naturally occurring asbestos.

Still, Tim Campbell says, the project is on track to provide improved traffic service to local and inter-regional travelers by fall of 2003.

– Gene Berthelsen

across a major state highway would have led to significant traffic impacts to inter-regional travel." The project's special provisions thus contained a requirement that the traveled roadway not be used to transport the dirt across the busy highway.

Modern Continental/Roadway solved this problem with construction of a conveyor bridge that crosses the highway. Dirt from the excavations is placed on one of two conveyor belts that traverse the bridge: one that accepts material screened to 75 mm to be used with geogrid for four of the fill slopes, and another that accepts unscreened material for unreinforced fill slope. "The system is capable of conveying as much as 300 m^3 per hour across the highway," Campbell says.

Because of the steepness and instability of the terrain, and the desire to preserve mature trees and avoid impacts to San Luis Obispo Creek, project designers incorporated seven retaining walls totaling 1.9 km in length — almost half of the project's total length. The walls, which constituted the first, two-year-long, major phase of the construction, included four mechanically stabilized embankment retaining walls:

Wall 2	550 m long	11.6 m high	11.5 m base width
Wall 5	150 m long	9.1 m high	7.9 m base width
Wall 6	133 m long	9.1 m high	7.9 m base width
Wall 7	303 m long	11.5 m high	9.1 m base width

The project also included three tieback walls, with ties drilled as far as 40 m into the hillside to penetrate beyond the slip plane and provide stability in the unstable section of the grade at **Wall 4**. Another of these, **Wall 9** involves placing a tieback wall in front of an existing, mechanically stabilized earth wall. Drilling into the MSE wall for the tiebacks involved hanging the drilling platform over the wall by means of a crane. "The galvanized steel strap stabilization inside the MSE wall was corroding," Campbell says. "It had to be stabilized with tiebacks. The new wall will not be affected by the problems with the existing wall." The tieback walls include:

Wall 4	172 m long	4.8 m visible height	31.0 m max pile height, 225 tiebacks
Wall 8	263 m long	11.2 m visible height	7.0 m max pile height, 335 tiebacks
Wall 9	135 m long	10.6 m visible height	18.0 m max pile height, 161 tiebacks

All of the walls have been darkened by placing dye in the concrete mix so that they blend more compatibly with their surroundings. The massive walls are dramatic when viewed from the top of the grade and, even more so, from the stagecoach road on the opposite side of the canyon. The most dramatic of them is a vertical wall at the top of the grade, probably the most visible manifestation of the entire project. This wall, over 250 m long and 11 m high and towering over the highway, has been separated into two individual faces to break up its visual impact, then textured and stained to resemble surfaces on walls of Mission San Luis Obispo in the town below.

Because of the steep terrain, limited workspace and unstable soils, the Cuesta Grade project uses a number of retaining walls of differing technology.

The Cuesta Grade provides no opportunities to haul material from cuts on the east side of the busy highway to embankments on the west. Therefore, the contractor has constructed a conveyor bridge to move material across the highway.

"Drainage is also a serious consideration on the project," Campbell says. "San Luis Obispo, at the bottom of the grade, receives about 600 mm of rain annually. Rainfall is double that at the top, about 1200 mm. The project thus will use 9.3 km of pipe for subsurface drainage, 4.3 km of new drainage pipe and 10.4 km of edge drains."

San Luis Creek is the primary drainage that runs along the bottom of the job; all disturbed earth must receive permanent stabilization within five days to prevent runoff into the creek. Polyethylene sheeting, straw wattles and fabric are used to stabilize the slopes. Hay bales and silt fences are used to catch siltation and slopes are planted immediately with native grasses.

Staging for traffic is also a major consideration in the tight confines of the construction area with 90 m-deep fills and 60 m-high cuts. Traffic is channeled though the job by means of K-rail; over the course of the project, it will have been repositioned three times. The K-rail was placed to move traffic away from construction of the retaining walls when the job started. Fill was then placed behind the walls and the traveled roadway moved onto the fill to allow for uphill excavations. After the new section is completed and paved, travel will be moved onto it and the middle portion of the road rebuilt. The project was designed to allow

(cont. on page 14)

PROJECT CUESTA GRADE

Because of the steepness and instability of the terrain, and the desire to preserve mature trees and avoid impacts to San Luis Obispo Creek, project designers incorporated seven retaining walls totaling 1.9 km in length — almost half of the project's total length.

CALIFORNIA PATH

Partners for Advanced Transit and Highways

Control is the name of the game. To a traffic engineer, there is a tantalizing amount of space between vehicles, even on crowded freeways. If you could use that space, you could dramatically increase roadway capacity.

Steve Shladover, Deputy Director of California PATH

In a shady eucalyptus grove on an early spring day, as Monarch butterflies flutter overhead, the future of California's transportation is being mapped out by a Freightliner truck whose driver sits with his hands in his lap as it labors around a forlorn asphalt oval track.

The systems that control the movements of that truck are the stuff of the future. What does that future, when California may have 50 million or more citizens, look like?

"Outwardly, it'll look a lot like it does today," says Steve Shladover, Deputy Director of California PATH, Partners for Advanced Transit and Highways, whose headquarters sit in a bucolic setting in Richmond, just off the San Francisco Bay.

"We would hope effective land-use planning would forestall the helter-skelter land use patterns that make our present system so chaotic," Shladover says. "But as the state develops, we expect to see a hierarchy of transportation—rail in the dense corridors where it already exists, bus rapid transit in the less dense ones, then demand-responsive transit elsewhere and individual vehicles operating elsewhere, but in a lot different fashion from the way they do today."

"Information transfer is already largely electronic, and we expect that revolution to continue taking some of the pressure off the transportation system," Shladover says. "And much of goods movement will be automated, with trucks, controlled by GPS-based systems, operating on dedicated truck lanes. As just-in-time production assumes an even larger role in our economy, the ability to get goods where they need to be, on time, will become very important."

Shladover sees information as absolutely critical. He is adamant that the term "transportation system" goes way beyond roads and other fixed infrastructure airports and rail. "It means the infrastructure, plus people and goods and vehicles," he says. "And the thing that binds those components together is communications."

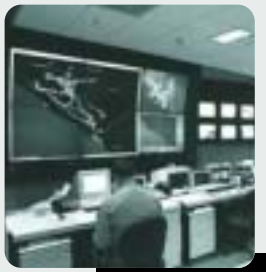
Thus, virtually all of PATH's work today is on some form of communications applications of information, either providing vehicle operators with better information on which to make routing or timing decisions, or information to control their speed and location.

PATH is administered jointly by Caltrans and the Institute of Transportation Studies at the University of California, Berkeley. It draws staff, faculty and students from universities statewide and cooperates on projects with private industry, state and local agencies and non-profit institutions.

California PATH was established in 1986 to build on earlier work in transportation management and to address concerns voiced by Caltrans managers about being able to meet future transportation demand solely with infrastructure investments.

Throughout the 1980s and 1990s, PATH built a network of researchers and thinkers throughout the U.S. and the world, initially performing or authorizing research into highway electrification to provide propulsion for vehicles, navigation and highway automation. It also worked on development of a national "architecture" for intelligent transportation systems —systems of hardware and software for the delivery of communications information among between users, vehicles and the infrastructure.

In 1997, PATH conducted a highly publicized test in which it sent a platoon of eight vehicles, equipped with radar sensing equipment and controlled by a guidance system in the pavement, down a stretch of the Interstate 15 HOV lanes in San Diego without direction from a human driver. The test, with sponsorship from the U.S. Department of Transportation, Caltrans and a consortium of vehicle manufacturers, educational institutions and technology companies, showed that external automatic control of the vehicles was possible; later tests have further explored a number of safety and control issues. That control location-referencing technology, utilizing magnets in the roadway and sensors in the vehicles, is today only one of several being tested, including use of GPS satellite navigation equipment.



Above: *"Platooned" driverless vehicles on Interstate 15.*
Middle: *PATH guidance systems could speed buses along their routes.*
Below: *More sophisticated PeMs data is expected to improve traffic operations.*

Control is the name of the game. To a traffic engineer, there is a tantalizing amount of space between vehicles, even on crowded freeways. If you could use that space, you could dramatically increase roadway capacity. If you could control vehicles as they merge when entering a freeway, you could sharply reduce the congestion that recurs at onramps. If you could control the vehicles at an intersection, you could reduce the number and severity of crashes.

A further test, in 2003, will demonstrate the possibility of platooning trucks and buses. This has a very strong potential for Bus Rapid Transit, which can be built at a fraction of the cost of light rail. "Buses, trained together and guided externally automatically, could operate on existing roadways or on exclusive narrow guideways as a single unit to avoid road congestion, improve ease of access for passengers and enhance fuel efficiency and driver cost," Shladover says. "The buses could be used to collect passengers in neighborhoods at one end and drop them off close to their destinations at the other, without requiring a mode transfer."

Transportation efficiencies can come in the darndest places, says Shladover. "For instance, a considerable amount of time, in the aggregate, is devoted to

(continued on page 18)

(continued from page 17)

passenger boarding and alighting. If a bus could stop precisely at a loading platform whose height were the same as the bus floor, passengers, even those in wheelchairs, could enter and leave the bus quickly and easily.

PATH has tested a system that will control a bus so it stops within 20 mm both laterally and longitudinally, of a control point. "A low-profile bus could stop at a loading island and the passengers could get on and off as easily as they do in a rail transit system," Shladover says.

The 2003 test will also demonstrate the possibility of platooning trucks. PATH has taken delivery on three gleaming new Freightliner tractors, which its engineers will equip with an array of magnetometers to detect magnetic markers in the roadway. The rigs will get steering, throttle and brake actuators to control them and an advanced laser radar collision avoidance system to detect the distance to a leading vehicle for platooning.

"Significant fuel savings are likely as a result of 'drafting' as the trucks operate closely together," Shladover says. "But, in addition, if you're thinking of building an exclusive truck facility, a much smaller infrastructure is possible if you can finely control the path of the truck. You might be able to have a 3.0 meter-wide facility lane, for instance, rather than 3.5 meters. And if the trucks can operate in a platoon, that dramatically raises the capacity of the lane, enabling a single lane to provide the capacity that would otherwise have required two."

It is in the less glamorous applications of technology, however, that PATH already has produced practical spinoffs. These include guidance systems for snow-clearing equipment that is now entering wide use at Caltrans, along with radar and guidance systems used in early tests that are now showing up on production automobiles.

And PeMS — the Caltrans Performance Measurement System, for integrated transportation performance management — is one of those systems that appears to have a very high potential payoff. PATH researchers, some time ago, took a look at the crush of data being provided by loop detectors in freeway pavement. "You were getting all this data, but you weren't making full use of it," Shladover says. "Our people applied a number of sophisticated algorithms to the data and found a number of things. One of them is that, contrary to accepted notions, less than half of the delay on Los Angeles freeways is recurrent delay.

Above: *Various guidance systems are being tested for vehicle control.*
Middle: *PATH staff continually input data into computerized guidance systems during tests.*
Below: *Cockpit of Freightliner truck being used in guidance tests.*

"Non-recurrent delay happens for a variety of reasons that may include something like weather, sun glare, a Highway Patrol stop, an incident in a nearby neighborhood, even a new message on a changeable message sign," Shladover says. "But what we think of as non-recurrent delay may actually be a part of a much more complex pattern than just the daily commute.

What does this tell a mother who has to drive a vanload of volleyball players from Oakland to Sacramento in time for the first game of the tournament?

"First," Shladover says, "the sensors can tell us what is happening out there in real time. You don't have to change the pattern of reds and greens at the ramp meter at the same time every day. You can change it as traffic conditions warrant. You can change the meters upstream or downstream from an incident. You can provide information to the mother through a variety of media, including changeable message signs, Web sites, and, eventually, even to the driver in the automobile."

"In most cases, what you get from commercial radio is too late. Your hypothetical mother is already in the mess and she's stuck. But if she can find out what's happening before she leaves, she can decide to take a different route – or even a different mode."

"Not only that, if you do a sophisticated analysis of the information, you can tell that driver how long it's probably going to take to get to Sacramento. You can go back into the past couple of years of data and find the days that look a lot like today – same day of the week, similar weather, similar traffic conditions– and you can tell the driver just what she should probably expect in the near future."

Caltrans director Jeff Morales has directed Caltrans Transportation Management Centers to begin using PeMS by July 1 of this year.

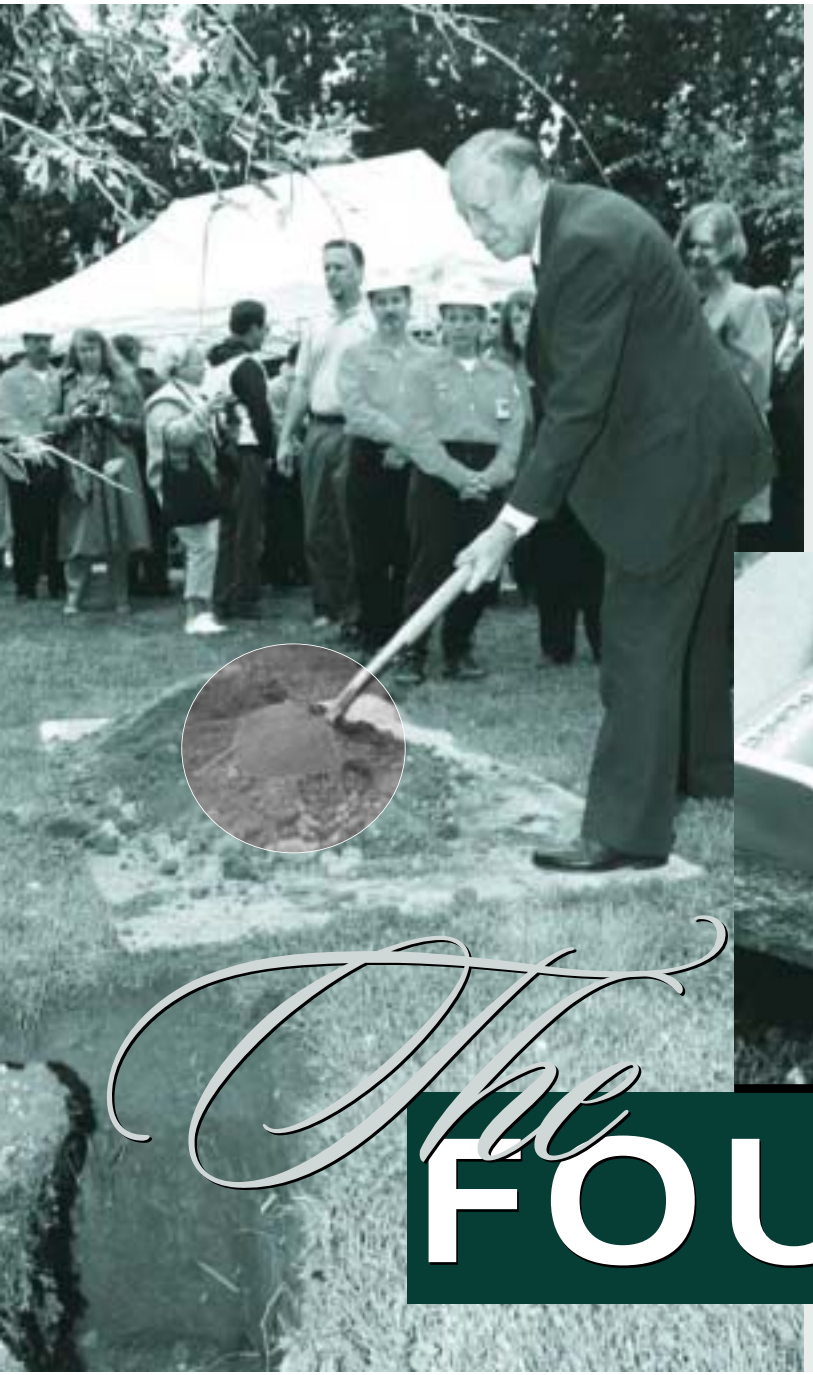
Meanwhile, in the warming spring sun, the Freightliner makes another trip around the test oval in Richmond, then another and another. It will make dozens, perhaps hundreds of trips, testing components of the vehicle, the roadway and the driver.

And, when it is done, it will have provided another piece of the puzzle that is the future of tomorrow's travel as California inexorably adds 500,000 new residents each year.

– Gene Berthelsen

California PATH was established in 1986 to build on earlier work in transportation management and to address concerns voiced by Caltrans managers about being able to meet future transportation demand solely with infrastructure investments.

Above: *PATH staffers observe videotaped demonstrations of guided vehicles.*
Middle: *"Suzy," a pavement stress tester, is part of the PATH program.*
Below: *Guidance hardware, including radar, on a PATH vehicle.*



On April 9 of this year, in a leafy glen in Sacramento's Capitol Park, several hundred Caltrans veterans, construction workers, elected and appointed officials and members of the media fell silent to watch as a unique landscaping effort got under way.

That effort involved the planting of a Valley oak, along with placement of a memorial plaque, to honor the 157 public employees who have lost their lives while working to keep California on the move.

"This will be a living memorial," says Heinz Heckeroth, executive secretary of the California Transportation Foundation, the sponsoring organization for the memorial. "I can't think of anything better, especially in California, than an oak tree, with its almost-timeless lifespan, overarching dignity and sheltering canopy, to honor our co-workers." Heckeroth is a former Caltrans Engineer who completed his career as Chief Deputy Director in 1988.

The FOUNDATION

The Capitol Park memorial is just one of the many activities that the California Transportation Foundation performs each year for the benefit of transportation workers and organizations. Others include scholarships, travel expenses for conferences, career development, an annual Transportation Forum and, each year about this time, a flurry of activity as the foundation takes nominations and hands out awards in the annual Tranny program to recognize outstanding individuals, projects and programs. Not content merely with placing memorials in public places, the foundation also provided $10 000 in direct assistance last year for two injured employees and the families of three employees who died unexpectedly.

"I can't think of anything better, especially in California, than an oak tree, with its almost-timeless lifespan, overarching dignity and sheltering canopy, to honor our co-workers."

—Heinz Heckeroth

The organization behind these beneficial programs is the California Transportation Foundation, now in its 14th year and recently merged with Californians for Better Transportation.

The California Transportation Foundation was incorporated as a nonprofit public benefit corporation in June 1988. The idea of an organization to support the efforts of California transportation agencies originated within Caltrans just as the generation of public servants who had taken California to its world leadership in transportation during the 1960s, '70s and '80s began to drift toward retirement. These managers, many of whom are members of Tom Brokaw's "Greatest Generation," thought it important to build an organization that could fund employee recognition and career development using private funding.

An 18-member Board of Directors and an Executive Officer direct the foundation's program. Since its formation, it has operated under a volunteer ethic. It has no paid staff or office space and depends on volunteer help and donations to accomplish its programs. Its expenses are limited to mailings, office supplies and informational material. It does not participate in political campaigns or lobby for transportation projects.

The foundation's board of directors includes private consultants, retired city and county executives, a former Amtrak vice president, and a healthy sprinkling of ex-Caltrans district and headquarters executives. Its recent affiliation with Californians for Better Transportation brings in additional horsepower from contractors, suppliers and planning and engineering consulting firms.

"Contributions to the foundation come from individuals and corporations," Heckeroth says. "Donations may be designated for a specific purpose or program or may be made as an unrestricted contribution."

The Capitol Park Memorial is an example of the foundation's efforts. The foundation's Worker Memorial and Assistance Fund, with a current endowment value of nearly $70,000, relies on endowments and donations to provide financial assistance to needy families and individuals. In recent years the fund has aided earthquake, fire and flood victims with uninsured or unrecoverable losses.

The foundation supports Caltrans participation in the annual State Worker Memorial Remembrance Day each April. Last year, its many activities included financial support for the Caltrans United Way Campaign, District 1's annual service recognition, the Sixth Annual Seismic Workshop, Caltrans' Quality Control Program awards, dedication of the William F. Leonard Interchange in District 8, a conference per diem travel grant and equipment for District 4's Engineering Summer Institute.

With an eye to tomorrow's transportation builders, the foundation holds an annual student education symposium, which brings top university students together with top transportation professionals, to give them a real-world look at transportation problems and how they are solved.

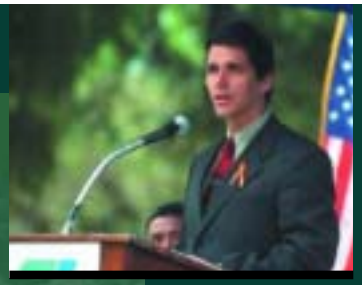
The 2002 Trannies, which will be awarded at the foundation's annual awards banquet early in May, drew 90 entrants in the categories of capital projects, operational programs and individual achievement. Capital projects include airport, highway, transit and other projects. Operational programs include community awareness, environmental enhancement, highway and transportation management and others. Among the individual awards to be given out are the Charles M. Purcell award for managerial excellence and the Karl Moskowitz award for excellence in transportation operations. And this year, the foundation has added an award for Structural Engineering in the name of recently-retired Chief Bridge Engineer James A. Roberts. All honor Caltrans' most distinguished alumni.

"We want to see responses that cover the geographic areas of the state and all modal aspects of transportation," Heckeroth says. "We'd like to see local and regional agencies develop their own awards system to feed us nominations for statewide recognition. We depend on others to do our work for us, but we repay in the coin of statewide recognition."

One of the foundation's allies is the Caltrans Quarter-Century Club, an organization that brings together working and retired Caltrans employees, mostly for social purposes, but which also provides an important base for volunteers and donations. "In starting the foundation, we wanted to separate ourselves from Caltrans as an institution," Heckeroth says, adding that the foundation wanted to provide assistance independently and without pressure for favoritism.

"The one thing I'd like to see is a buck or two a month from current Caltrans employees through the United California State Employees Campaign," Heckeroth says. "We could do so much for career development, peer group relationships and assistance for some really worthwhile activities. I know that if people could see the letters from scholarship winners, families of those we have assisted and students who are graduating from the symposium, the response would be much greater. I'd like to see our professionals get caught up in giving of themselves and reliving their careers by advising and assisting the people coming up."

—Gene Berthelsen



Jeff Morales

Hundreds of Caltrans workers, media, officials and industry representatives attended the worker memorial in April.

CALIFORNIA'S FASCINATING ROADS

"There's no there, there."
—Gertrude Stein

A Road Through Nowhere

The Journal was warned, before proceeding to U.S. 95 for a trip between Blythe and Needles, that there was "nothing out there."

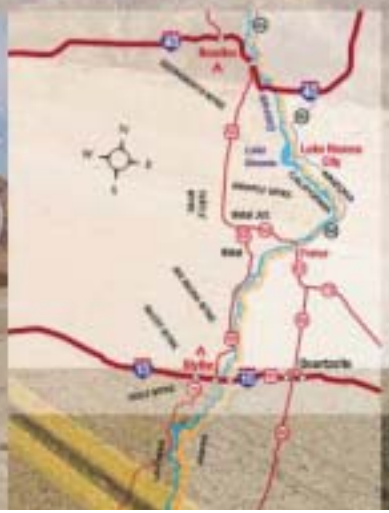
And our first look at what could easily be a moonscape prompts the notion that Gertrude Stein could easily have named the place. But the fact is, as with most places, there's plenty there out there, if you just take a little time to look closely, despite an old Caltrans curse about a shovel waiting in Needles for anyone who really fouls things up good.

Route 95 is a "U.S." Highway, of which there are seven in California – U.S. 6, 50, 97, 101, 199 and 395. The only thing they share is that they cross a California border into another state while retaining the same route number. Thus, the nearby Route 62, which also crosses the border, is not a U.S. highway, because it connects into Arizona's Route 95 on the other side of the border. That said, being a U.S. highway does not seem to confer any particular distinction on a highway. Anne Mayer, District 8 Director, will tell you that, for a variety of reasons, it's a challenge to maintain it, but the district has projects coming up to help keep the desert crews safe and the RVs moving.

"The desert is a beautiful and unique environment," Mayer says. "It's important to minimize our project impacts."

U.S. 95 links Interstates 10 and 40, out in the Mojave Desert where the Arizona border and the Colorado River parallel one another. Blythe, astride Interstate 10, is a great beneficiary of water from the Colorado River, the watery Mother Lode of most of the life around here for hundreds of kilometers.

Blythe, a farm town, is named after Thomas Blythe, who filed a claim in 1877 for water rights and planned the first diversion dam on the Colorado to irrigate the Palo Verde Valley. That made settlement by Europeans possible in a



dried up & brittle road

"It's old, it's dried up, it's narrow, it's brittle and it's gray, instead of a pretty shade of charcoal that characterizes new pavements," Edward Mindiola says. "That's what comes when the average high temperature in the summer is 115 degrees."

115°

place where the sun beats mercilessly down for 10 months a year, occasionally driving the temperature to as high as 125 degrees. In this baking heat, Blythe is surrounded on all sides by impossibly green alfalfa fields that wash right up next to the newest housing subdivisions.

Blythe is flat. Not just the land it sits on or the way it sits on the land, but the town itself. There aren't more than a couple two-story buildings in Blythe. Overall, the impression is that the sun has squeezed the excess stuff right out of this town the way a cookie shrivels when it has stayed too long in the oven. This is a utilitarian town that still has feed stores and pharmacies on its wide main street; the big boxes haven't yet plunked themselves down in the alfalfa fields. And it's a neat place, with well-kept homes and orderly streets. You could make a movie about the 1950s here.

And Blythe is where U.S. 95 heads for Needles. At the Caltrans maintenance station, we run into Edward Mindiola, a Maintenance Leadworker who laments U.S. 95's condition. "It's old, it's dried up, it's narrow, it's brittle and it's gray, instead of a pretty shade of charcoal that characterizes new pavements," Mindiola says. "That's what comes when the average high temperature in the summer is 115 degrees."

Even in those temperatures – the hottest he's experienced is 123 degrees – maintenance work goes on. Mindiola's survival trick is to soak a bandana in water and place it under his hardhat for evaporation.

A large share of U.S. 95 traffic is made up of snowbirds, folks from places like Manitoba or Tacoma or Fargo, skippering mountainous motor homes with Jeep Grand Cherokees in tow. "You have to keep your wits about you when you're working out there," Mindiola says. "Especially when you get a couple of them passing one another."

With the motor homes in mind, we head out of Blythe on a clear March morning, the smell of new-mown alfalfa in our nostrils. U.S. 95 passes squat farmhouses and thousands of hectares of irrigated fields of the Palo Verde Valley. In this parched landscape, it's water that you keep thinking about. The Colorado River is just a few hundred meters away and everything you see exists in its largesse: green fields, sprinklers gushing and newly-tilled fields awaiting their first irrigation of spring.

The Colorado is host to a number of endangered species, including the southwestern willow flycatcher, Yuma clapper rail, the razorback sucker, bony-tail, bald eagle and the yellow-billed cuckoo. These constitute another reason, Anne Mayer says, why Caltrans won't be doing much to improve U.S. 95 in the near future.

Up ahead, the Big Maria Mountains loom, a subtle palette of gray, purple, red, tan, brown, rust, ochre and charcoal against a cerulean sky. U.S. 95 treads a clear demarcation between the barren hills to the left and the riparian habitat in the river bottom to the right. On the highway shoulder is a roadhouse of some sort, optimistically dubbed Black Pointe in hopes of gaining some cachet, but it was unsuccessful. Black Pointe is a rotting hulk, giving testament to the transitory nature of human things around here. This landscape has temporarily been altered by mankind, but a sun-driven, geologic entropy is at work that will eventually get us all.

It just got to Black Pointe a little quicker.

Up the road, out on a nearby mesa, are the Blythe Intaglios, three large figures that ancient Mojave and Quechan Indian tribes engraved onto the land by scraping the weathered layer of stones off the earth and leaving a lighter, sandy surface. Somewhere between 450 and 2000 years old, they include a 52 meter-long human figure and several humanistic animals. While you can get an idea by looking across the chain link fence, you'd really need an airplane to get a God's-eye view.

Bald Eagle

The Colorado River is host to a number of endangered species, including the bald eagle.

According to modern-day Indians, the human figure represents Mastamho, the creator of earth and all life. The animal figures represent Hatakulva, one of two mountain lion-human hybrids who helped in the earth's creation. In ancient times, the Indians performed sacred ceremonial dances in the area to honor them.

Must have been hot work, and it gives you pause to reflect that the area's earlier inhabitants appear to have had the same work ethic as Edward Mindiola.

Back out on U.S. 95, you pass dirt roads heading off toward the river every few hundred meters. Down those roads are hidden what surely must comprise the

(continued on page 28)

Black Pointe

Black Pointe is a rotting hulk, giving testament to the transitory nature of human things around here.

(continued from page 27)

strongest market anywhere for manufactured houses, some with wheels and some not; but even those without give a clear impression of transience. The river bottom is dotted with portable homes, as if, someday, should the upstream dams fail and the Colorado flails around the Palo Verde Valley like a decapitated snake, they'll be able to pick up and move in a jiffy.

Halfway to Needles, there is Vidal — two Vidals, really — old Vidal and Vidal Junction. Vidal is another slug on the biceps about the impermanence of desert life. There are, count 'em, six domiciles in various states of habitation and three decaying businesses (all closed), rusting cars and a lot of broken glass. Vidal seems have to migrated to Vidal Junction, 9.3 km up the road, and it is here that you get a pretty good idea of what desert life is all about when it's winter everywhere else. Vidal Junction, at the corner of U.S. 95 and State Route 62, isn't much bigger than Vidal, except that it's inhabited. There are several look-alike houses, the Caltrans Maintenance Station, a Department of Agriculture Inspection Station, the Vidal Junction Café, Gas Station and Mini-Mart and a huge sign that has no business attached to it. At any given moment, about a dozen motor homes are pulled off onto the dirt, each one bigger than the last.

pulling a heavy load

The drive into Needles takes you up and over Loeck's Pass, at 606 meters altitude not an especially arduous climb unless you are pulling a major domicile in 120-degree heat.

The owner of the Vidal Junction Café seems to have bought up a vast store of anti-Clinton political memorabilia, ignoring the fact that the ex-President is a private citizen these days. This is rugged individualist country.

Out on the highway again, you recall the old Sons of the Pioneers song that goes,

"All day I faced the barren waste,
Without the taste of water,
Cool, cool water."

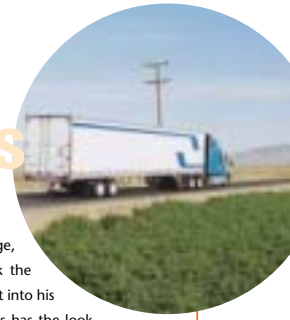
Serious desert, here, although U.S. 95 has some of that pretty charcoal pavement that Ed Mindiola yearns for. Looks like District 8 has favored the highway with a couple CAP-Ms recently. The land rises slightly and as it does so, yucca starts to pop up. You wonder, as you see them, how it is that the difference of a few meters of altitude is a make-or-break point for a species, but there they are, looking like so many spiky, green likenesses of Lucille Ball.

Down a 30 km drive off U.S. 95 and across the river on the Arizona side is Lake Havasu City, a now-thriving city founded in 1964 by chainsaw entrepreneur Robert McCulloch, who saw the potential for a city along the backwater of the Parker Dam when everybody else saw just desert.

In 1971, when McCulloch heard that the 140-year-old London Bridge, a victim of its own immense weight, was sinking toward the bottom of the Thames River, he had it disassembled and flew its bricks to Lake Havasu where they were reassembled over a newly dug-out lagoon. It wasn't long before tourists started showing up and the town was fat with cash from folks who came to see the bridge, then bought homes to stay. Nowadays, the London Bridge is one of Arizona's biggest attractions and Lake Havasu City has golf courses and a winter population of Winnebagos. There's even a Wal-Mart a few blocks north of the bridge.

trucks and motor homes

U.S. 95 is a major route for trucks and motor homes between Needles and Blythe.



All of that is on the Arizona side of Lake Havasu. On this side, the Chemehuevi Indians have taken advantage of Californians' affection for gambling and have established a thriving casino among another scattering of manufactured houses.

The drive into Needles takes you up and over Loeck's Pass, at 606 meters altitude not an especially arduous climb, unless you're pulling a major domicile in 120-degree heat. It's only March, but you can imagine the Dodge Rams lined up alongside the road, their radiators steaming.

At the bottom of the grade is the end of our trip: Needles, founded soon after the Santa Fe Railroad came through in 1883 and named for the group of sharp stone spires that stands near where Interstate 40 crosses the Colorado River into Arizona. Needles is one of the hottest places in the country, with summertime highs hovering between 100° and 120°F for months on end.

Needles has a rich Route 66 heritage, although Bobby Troup didn't think the town provided enough kicks to put it into his famous song. Unlike Blythe, Needles has the look of a town that Interstate 40, roaring past up on the hill, has left behind. Its main street, once witness to long lines of steaming Model As as the Joads and their compatriots moved westward to California — where you could pick an orange right off a tree — is lined with abandoned gas stations, cafes, motels and other institutions that once served the migrants.

Yet, as the cactus bides its time in the blazing sun, so does Needles. There are signs of life in fresh coats of paint, optimistic new businesses and, up the hill, a new subdivision. One has the impression that the Joads, having found their way to the end of the continent, are now coming back the other way, headed, like so many snowbirds, for the succor of the Colorado River and a there that really is there.

– Gene Berthelsen

The Albany Mudflat Mitigation Project

By Bryan Walker
Landscape Architect,
Caltrans District 4

On a breezy spring day under a cobalt sky it is possible, thanks to Caltrans, to stand on the shores of the San Francisco Bay near Albany and watch Canadian honkers, great blue herons, great egrets and snowy egrets aim their beaks at fish, invertebrates, and small mammals. California clapper rail, sora and Virginia rails hunker down in marshes. At low tide, willets, marbled godwits and American avocets scurry along the exposed banks of meandering tidal sloughs and channels, while at high tides, water birds such as American wigeon, mallard, American coot and pied-billed grebe paddle submerged channels. Alameda song sparrows, saltmarsh common yellowthroats and marsh wrens warble from vegetation at higher tidal elevations. Black phoebes, swallows and sometimes bats wheel on flying insects.

Bryan Walker, mitigation project manager

This maelstrom of avian activity takes place on the shoreline of the Bay, within a short distance of cars and trucks roaring by on Interstate 580, near what once was an unlovely spot occupied by rusting shopping carts, old tires and busted-up concrete – the Albany dump.

Back in the early 1990s, when Caltrans proposed to upgrade Interstate 80 along the bay shoreline by adding high-occupancy-vehicle lanes, District 4's environmental branch sat down with the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, the San Francisco Bay Conservation and Development Commission and a host of other permitting agencies to work out a mitigation plan.

The construction projects affected 1.6 ha of buffer habitat and 0.31 ha of wetlands. Caltrans created 1.13 ha of wetlands as compensation with an additional 0.04 ha of new roosting habitat and converted 1.38 ha from upland habitat to new high-quality native transition habitat at a 1:1 ratio.

"Left alone, the bay's east shore would consist of brackish marshes, sandy beaches and foredunes, grasslands, scrub, trees and non-tidal wetlands," says Bryan Walker, project manager. "But about 85 percent of this habitat had been lost to industrial development, salt production, urbanization and private use. The agencies watching over the bay's wildlife were interested in a mitigation project that could fit into their overall efforts to restore at least a portion of the lost habitat. Other cities and regional agencies were interested in a plan that would be compatible with the ambitious Eastshore Park then being planned."

The resource agencies proposed a number of sites for the mitigation, which Caltrans then evaluated for cost-effectiveness. Following consultation with Point Reyes ornithologists, the department selected the Albany Plateau and Central Avenue sites and tested for hazardous waste; the Albany Plateau was eliminated because of potentially high cleanup costs. Caltrans then evaluated cleanup strategies for the Central Avenue site, which had been used by various scavenging agencies as well as illegal dumpers between 1947 and 1990, and proposed to purchase the right of

The Albany Mudflat reclamation was mitigation for construction of the interchange of Interstates 80 and 580.

way and remediate its hazardous wastes onsite through soil berming, encapsulation and revegetation.

The project excavated approximately 38 000 m^3 of material to create the wetlands; approximately 23 000 m^3 of this was placed in a nearby 1.09 ha area to create a contour graded berm encapsulated with 600 mm of imported topsoil. Approximately 6900 m^3 of hazardous material was transported to a disposal facility.

The department developed remediation alternatives that conformed to the requirements of the Department of Toxic Substances Control and the Regional Water Quality Control Board. A cost-benefit analysis determined that substantial cost savings could be made by purchasing the entire Central Avenue parcel and performing on-site remediation (encapsulation) of hazardous waste.

The east shore's tidal marshes, particularly near South Richmond, had a potential to provide habitat for special-status species. Caltrans proposed to excavate and remove the hazardous waste and exotic plants and to create new wetlands and shorebird roosting habitat, including three islands on which shorebirds could roost.

The project, completed in two phases, required close coordination to avoid staging conflicts with the nearby interchange reconstruction project. The U.S. Fish and Wildlife Service recognizes the Albany mudflat as the most critical bird habitat in the central portion of San Francisco Bay. Thus, contract specifications included strict provisions to protect the sensitive project area. To protect bay water quality during construction of the roosting islets and new saltmarsh wetlands, open graded areas were armored against daily tidal inundation by a polyethylene-covered berm.

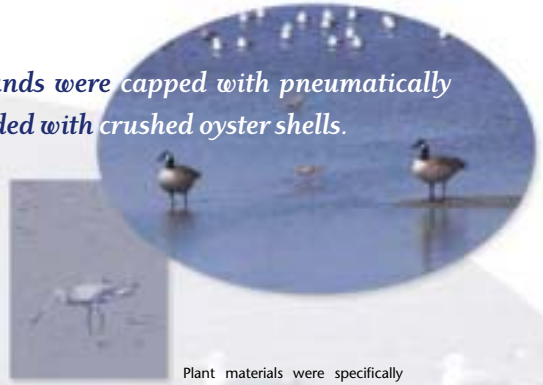
Prior to construction, contractors' employees were trained to identify and to protect native plant species. During construction windows to avoid disturbance to migratory waterfowl and possible taking of shorebird nests, they removed the debris, including riprap, with a long reach excavator, working from the newly graded bike path near the Route 580 freeway. Debris sleds were also used, but hand work, especially difficult in soft mud at low tide, was required to load the sleds for transport to the shoreline.

Phase I, dovetailing with the nearby Interstate 80/580/Buchanan Street Interchange reconstruction project, included careful collection and removal of tidal debris that had accumulated over the past 50 years, using sleds fastened to cranes or large-tired, all-terrain vehicles. The contractor, O. C. Jones and Sons of Berkeley, then graded down portions of the old 1.1 ha Central Avenue landfill site by 3.5 meters to remove hazardous materials (old batteries and related waste) and created three shorebird roosting islands and salt marsh wetlands with moats to protect the birds from humans and predators. A 3.6 m-high earthen berm was built, capped with 600 mm of clean topsoil and then re-vegetated.

Two of the roosting islands were capped with pneumatically applied mortar and seeded with crushed oyster shells.

Two of the roosting islands were capped with pneumatically applied mortar and seeded with crushed oyster shells. They were paved to keep vegetation from growing and covered with oyster shells, as most shorebirds require roost sites with unobstructed views of approaching predators. The third islet was allowed to be vegetated. During high tides, moats develop around the islets to protect roosting birds from human intrusion and other land-based predators.

Phase II work included replacement of 730 linear meters of rip-rap shoreline protection with bioengineered stabilization, consisting of a soil-filled, cellular confinement material nailed to the slope, and planted with the appropriate salt marsh and transition zone species.

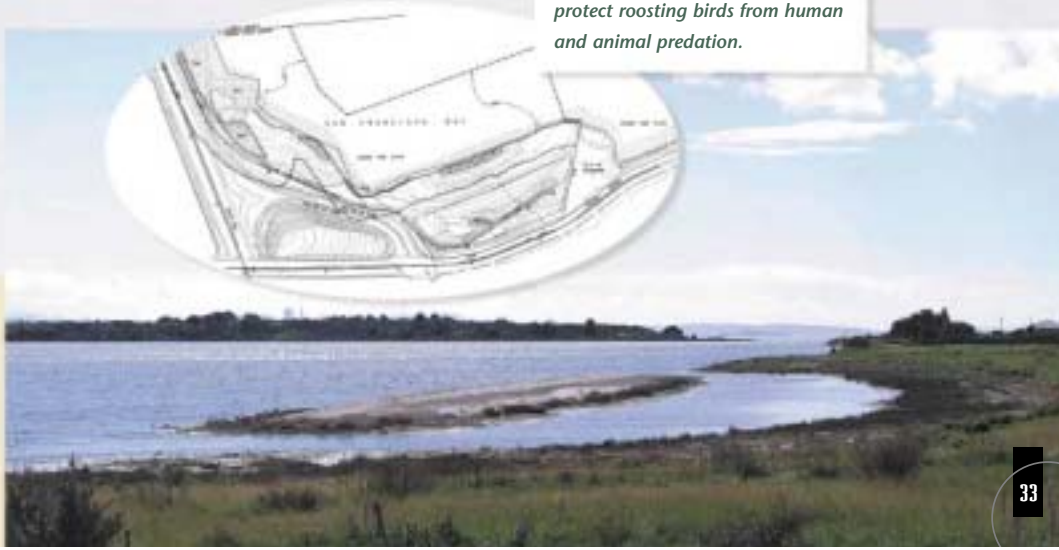


Plant materials were specifically grown for this project and were derived from propagule collected near the project site. Caltrans developed an aggressive program to remove exotic species, then carefully restored disturbed areas to native coastal vegetation with intensive planting, providing supplemental irrigation until the new plantings were established. A follow-up plant establishment regime ensured removal of new or reemergent exotic plant species.

Recolonization of native plant species is rapidly under way. Establishment criteria for species composition, density and cover are on target and indicate a successful remedial plan and a productive habitat. Roosting islands are attracting shorebird populations. The California Least

(continued on page 34)

Caltrans created three islands to protect roosting birds from human and animal predation.



(continued from page 33)

Tern, a federally listed species, has successfully nested on the western bird island.

Most projects along the shoreline of the San Francisco Bay inevitably involve a tug of war between agencies that protect natural species and those whose mission is to provide Bay Area citizens with access to the shore. The Albany Mudflat project was no exception. Compatibility issues involving the protection of bird habitat vs. public access required considerable time negotiating between the resource agencies, local jurisdictions and citizen groups during design and construction phases to establish the location and the extent of screening along the path. While restoration efforts have significantly improved habitat values along the shoreline, the inclusion of a multi-use pathway along the Albany shoreline enhances the recreational value of the project.

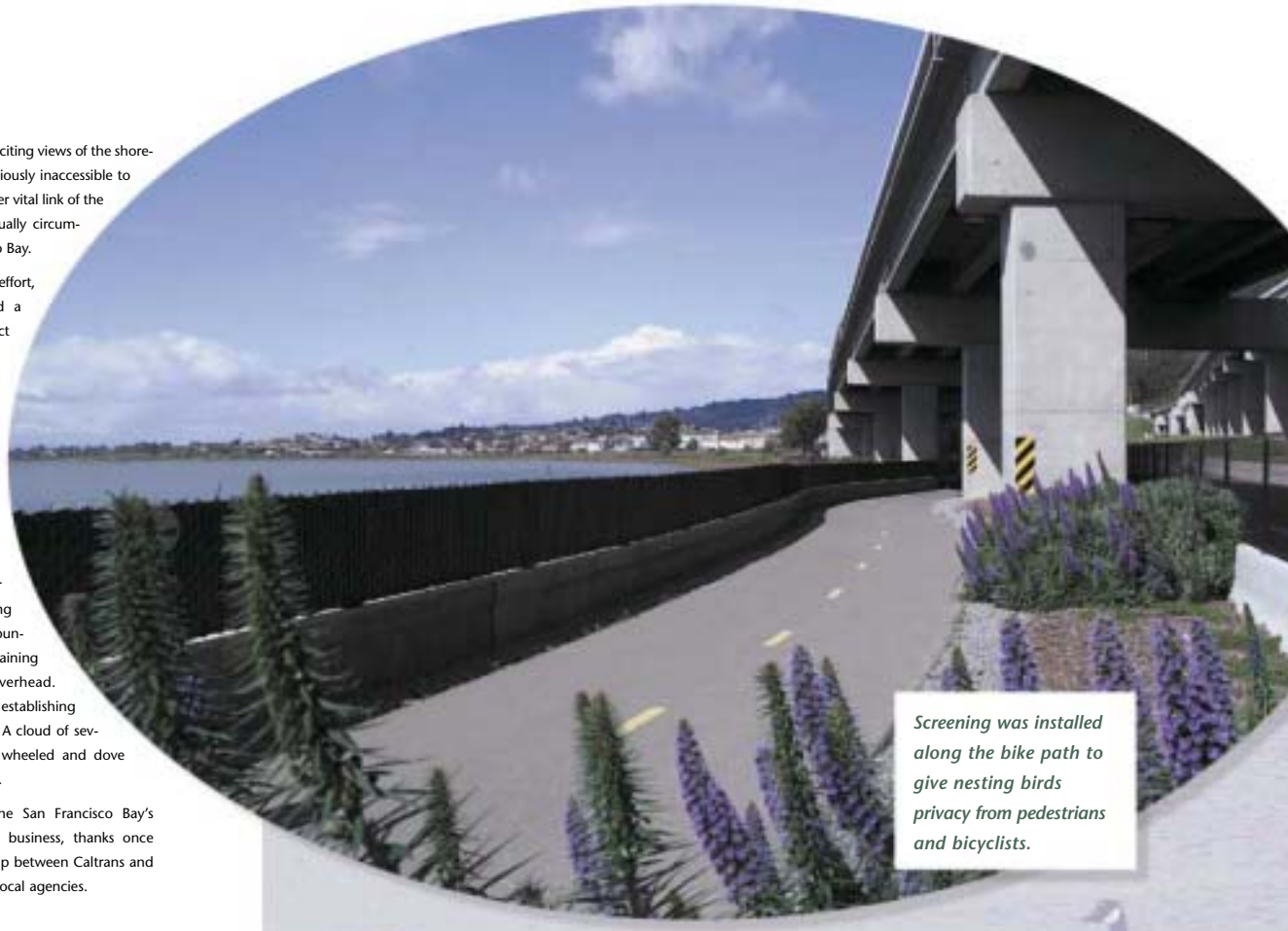
The multi-use path, an extension of the Bay Trail system, traverses the berm and includes an observation area that affords views of the roosting islands and the San Francisco skyline. Public safety and maintenance vehicles have access at either end and can travel the length of the trail. A 1.5 m-high fence on the bay side of the trail restricts access of humans or dogs to the shoreline.

Cleanup and restoration of the site have significantly improved visual quality and strongly unified the visual corridor for both Bay Trail users and freeway motorists. It opens up a variety of new and exciting views of the shoreline environment that were previously inaccessible to the public, and completes another vital link of the Bay Trail system that will eventually circumnavigate the entire San Francisco Bay.

As a result of a collaborative effort, careful attention to detail and a Caltrans commitment to protect and promote the environment, Bay Area citizens have been rewarded with a transportation enhancement project that is aesthetically pleasing, environmentally responsible and highly successful.

On our spring walk, California least terns, American avocets, black-necked stilts and killdeer were using the islands for roosting and as nest sites. Insects were abundant and diverse. Geese, complaining loudly, honked in from overhead. Pickleweed and cordgrass are establishing themselves along the shoreline. A cloud of several hundred small gray birds wheeled and dove around the southernmost island.

And an important piece of the San Francisco Bay's ecological system was back in business, thanks once again to a productive partnership between Caltrans and a dozen resource, regional and local agencies.



Screening was installed along the bike path to give nesting birds privacy from pedestrians and bicyclists.

As a result of a collaborative effort, careful attention to detail and a Caltrans commitment to protect and promote the environment, Bay Area citizens have been rewarded with a transportation enhancement project that is aesthetically pleasing, environmentally responsible and highly successful.

The urban design concept for the Bus Rapid Transit project is a busway and bikeway within a 22.5 km linear greenway.

BUS Rapid Transit

Kathleen Sanchez, L.A. County Metropolitan Transit Authority

Bus Rapid Transit, operating on dedicated bus lanes, is cropping up in transportation journals recently as a way to provide a high level of transit service with a substantially lower infrastructure investment than needed for rail. Generally, it involves coordinated improvements in infrastructure, equipment, operations and technology to allow buses to move on exclusive guideways, high-occupancy vehicle lanes or on city streets with signal priority.

Warner Center - Western Terminus

In the southern San Fernando Valley, between the Los Angeles County Metropolitan Transit Authority's Metro Red Line Station in North Hollywood and the Warner Center in Woodland Hills, a 22.5 km section of an abandoned Southern Pacific Railroad line is being converted into California's first Bus Rapid Transit line on exclusive right of way.

Kathleen Sanchez is MTA's manager of the $329 million project. "East-west travel in the Valley will continue to increase, with parallel increases in traffic congestion and delay," she says. "But on its own pathway, this Rapid Bus, traveling between the Red Line and Warner Center in 35 minutes, will not degrade. It will become increasingly competitive with other forms of travel."

When the east-west Valley Line is fully operational, buses will operate on 7-to-10 minute headways during peak hour service, fully integrated with enhanced north-south bus and transit service and complementing other parallel valley service. "We don't expect to eliminate any existing service," Sanchez says.

Separating bus traffic from automobile traffic reduces travel time, a primary goal of the Valley Line. Buses on urban streets generally move at about 60 percent of the speed of other vehicles. But Bus Rapid Transit operations can benefit from a number of improvements that allow them to operate faster. All, these improvements, Sanchez says, will be features of the San Fernando East-West Corridor project. They include:

Traffic signal priority. Valley Line buses will get a "smart" green light that allows them priority but considers vehicle traffic at intersections so traffic is not tied up for inordinate periods of time.

Boarding and fare collection improvements. The Valley Line will use prepaid "smart card" passes and low-floors and wide doors to get people on and off faster.

Limited stops. The Valley Line will provide express service between stations that average of 1.5 km apart.

The old Southern Pacific Station (top) in North Hollywood will be renovated to provide a direct connection to MTA's Red Line. It runs westward along the median of Chandler Boulevard (above).

Improved stations and shelters. Low-profile buses and raised platforms will allow passengers to board quickly — especially the physically impaired.

Intelligent transportation system technologies. Advanced technology will maintain consistent distances between buses. Passengers will be able to read displays telling them when the next bus will arrive.

The Valley Line starts in North Hollywood at the Red Line Station, where MTA plans the rehabilitation of the old Southern Pacific Station as a transit center and, in the future, provide a direct underground connection from

The Valley Rapid Bus Line's eastern terminus is at MTA's colorful North Hollywood Red Line Station.

the Red Line to the Bus Rapid Transit line. The Valley Line runs westward along the median of Chandler Boulevard, continuing on the old Southern Pacific right of way near Valley College, one of two colleges on the route. Bus shelters are at Laurel Canyon Boulevard, Valley College and Woodman Avenue.

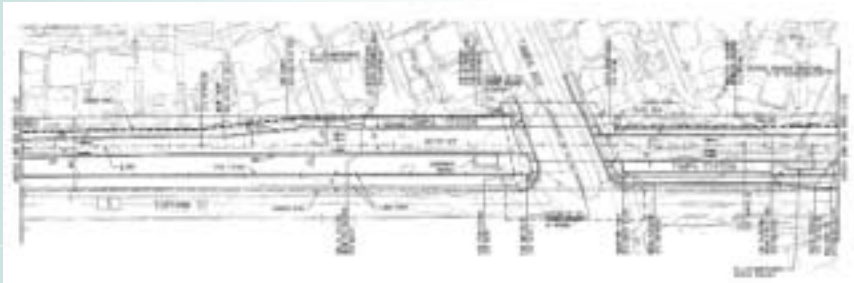
From here, the line, with a station to serve a major employment center at the Van Nuys Government Center and another at Sepulveda Boulevard, crosses under Interstate 405 and skirts the Sepulveda Dam Flood Control Basin and Recreation Area. Paralleling Victory Boulevard, it serves stations at Balboa and Reseda Boulevards and Tampa Avenue. It provides service to Pierce College at Winnetka and De Soto avenues, before making a 1.6 km on-street circuit of the Warner Center, the third-largest employment center in Los Angeles County.

Thirteen stations are planned for the line.

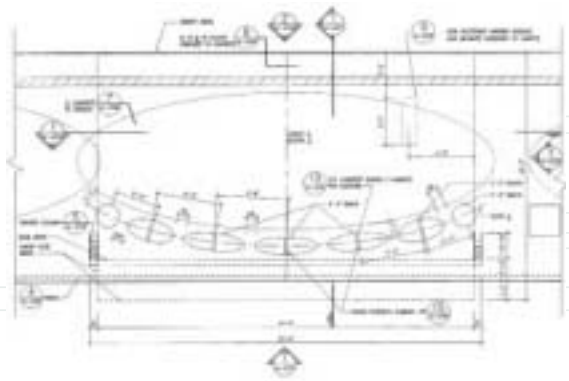
The project will improve a number of intersections along parallel streets, both to reduce congestion generated by drivers attempting to access the line's 13 stations and to allow the buses to receive traffic signal priority without degrading the existing street circulation.

The asphalt guideway, 7.9 meters wide, is being constructed to a section that could accommodate light rail if passenger volumes (and financial resources) eventually become adequate to justify it, Sanchez says. "It is within a 30-m right of way, purchased from Southern Pacific, that will accommodate landscaping, such as berms, trees, fences and walls and shrubs, to buffer the busway from nearby homes and businesses."

That is a major consideration. The route traverses a number of residential neighborhoods, and nearby residents are concerned both about buses traveling within a few meters of their back yards and increases in traffic around the stations. "Because of that, most of the route will be fitted with sound walls and vegetation that screen



The Rapid Bus Line project includes improvements to the intersecting streets to improve vehicle access and reduce traffic interference.



North Hollywood to Warner Center—a typical canopy plan at platform level.

both sight and sound of the vehicles. In addition, MTA is writing vehicle specifications that call for low-profile, quiet and nonpolluting buses," Sanchez says. She is interested in using hybrid-powered buses that run on a combination of compressed natural gas and electricity.

When the line begins to approach its projected daily ridership of 25 000 (other on-street MTA Rapid Bus lines have quickly exceeded all predictions), MTA will put 25 m-long clean fuel (hybrid-powered) articulated buses into service. No manufacturer in the U. S. currently builds such a bus. Therefore, unless MTA can entice a manufacturer to venture into this type of production, the authority is likely to have to conduct its procurement in Europe.

A recent review of Bus Rapid Transit systems by the Federal Transit Administration indicated that they generally had substantially lower capital costs per kilometer than light rail systems, although neither system had a clear advantage in operating costs. In 2000 dollars, the capital costs for the various types of Bus Rapid Transit systems in cities that were reviewed ranged from a low of $320 000 per km for an arterial street-based system to $88 million per km for a system on a dedicated right of way. Light Rail's capital costs ranged from $19.8 million to $213.8 million per km. At $320 million, the Valley Line's capital cost pencils out to about $14.3 million per km.

Capital cost per kilometer

Project type	Number of facilities examined	Cost range	Average cost
Busways	9	$11.2 million to $88 million	$21.7 million
HOV lanes	8	$2.9 million to $60.2 million	$9.0 million
Arterial streets	3	$320,000 to $15.4 million	$1.0 million
Light Rail	18	19.8 million to $190 million	$55.6 million

The Federal Transit Administration found it difficult to compare operating costs precisely for Bus Rapid Transit and Light Rail system because of differences among transit agencies, transit systems and how they account for costs; however, bus systems generally had lower vehicle operating costs.

Bus Rapid Transit and Light Rail systems offer various advantages and disadvantages. Bus Rapid Transit is more flexible than light rail because buses can be routed to eliminate transfers. Buses also can be operated on busways, HOV lanes and city arterial streets. And if a rapid transit bus happens to malfunction, other buses can merely pull out and pass them. FTA contends that using technological advancements will allow buses to operate with the speed, reliability and efficiency of Light Rail. The bus system can be implemented in stages. Buses, however, suffer from a poor public image. The Valley Line attempts to offset this by offering quieter, easier, faster and more comfortable bus service. In addition, its permanent presence in the corridor could influence economic development over time. Thus, MTA staff will be working with planning agencies and private developers to encourage transit-oriented development near its stations.

The Federal Transit Administration is currently stirring interest in Rapid Bus systems. While it has no specific program designed to fund them, it does provide funds through several, primarily its New Starts Program. Eligible projects face stiff competition from light, heavy and commuter rail projects. In addition, transit agencies use other FTA funds, such as those from the Bus Capital Program and the Urbanized Area Formula Grant Program for Bus Rapid Transit projects. And some Bus Rapid Transit projects may qualify for federal highway funding, notably Surface Transportation Program and Congestion Mitigation and Air Quality Improvement funds.

The Valley Line's $329 million price tag is made up from vehicles at $60 million, busway at $58 million, stations at $20 million, additional right of way at $22.6 million and the balance for mitigations, systems, yard modifications, etc.

The Federal Transit Administration began a demonstration program in 1999 to highlight the benefits of Bus Rapid Transit, awarding $50 000 grants each to 10 transit agencies to show how using technological advancements and improving the image of buses would allow them to increase ridership and operate with the speed, reliability and efficiency of light rail. The program provides workshops and information-sharing opportunities for the transit agencies, but no capital funding. Grantees' projects include busways, arterial bus lanes and new technologies.

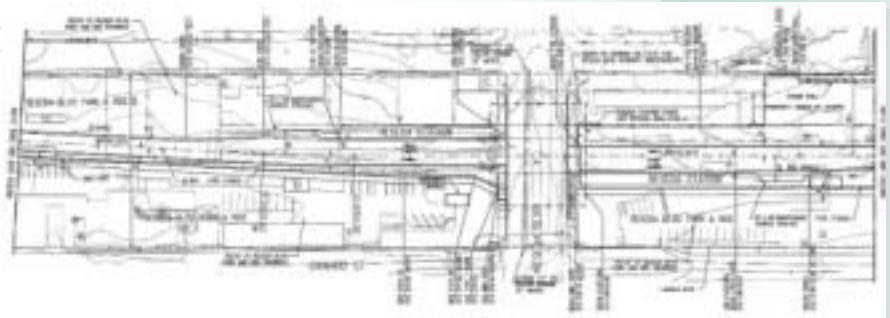
From the Federal Transit Administration's perspective, Bus Rapid Transit is a step toward developing public transit systems that have the performance and appeal of Light Rail transit, but at a lower capital cost and with greater flexibility to pick up and distribute passengers at either end of the line.

The FTA promotes Bus Rapid Transit with the slogan "think rail, use buses."

— Gene Berthelsen

Separating bus traffic from automobile traffic reduces travel time, a primary goal of the Valley Line.

Plan detail of Valley Line station at Reseda Avenue.



Roundabout INTERSECTIONS

By Jerry Champa, Headquarters Traffic Operations Liaison Engineer, Districts 7 and 12
Steve Price, Deputy Director for Maintenance & Traffic Operations, District 5

It's not often that a respected newspaper like the *Wall Street Journal* gives front-page coverage to an unsophisticated highway intersection concept, but it happened in January when the *Journal* ran a story on public reaction to a handful of roundabout installations around the United States. Though the article's scope was limited to highlight the controversial aspects of roundabouts, transportation professionals should be pleased that the *Journal's* story is pushing along a debate that is becoming common at town hall meetings across the country.

Anyone who has ever encountered a traffic circle during a trip to the eastern USA has probably formed an opinion about all rotary or circular intersections. But the traffic circles still found in Washington, D.C. or New England represent only the first generation of circular intersection, a form that was popular during the first half of the 20th century. At best, they are distant cousins of modern roundabouts that first appeared in the U.S. around 1990 and arrived in California in 1992. Unfortunately, the stigma generated by the performance limitations of the traffic circle has firmly attached itself to the roundabout and severely limited its consideration as an effective alternative to more conventional traffic control measures.

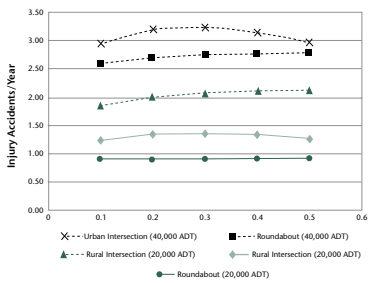
Roundabouts first evolved in the mid-1960s when the British re-engineered the traffic circle to overcome its limited capacity and related safety problems. The differences between these two circular intersection forms are not readily apparent to the typical driver, but the difference in performance is dramatic. Roundabouts are easily confused with traffic circles because they have the same general physical appearance. However, only the roundabout operates with yield control at each entry to give priority or right of way to circulating traffic. The original traffic circles were designed to give priority to entering vehicles. This facilitated high-speed entries and forced circulating traffic to yield, causing high crash experience and congestion at relatively low traffic volumes.

How slower can be faster

Another difference, which is necessary for optimum roundabout performance, is the low speed for entering and circulating traffic, as governed by small circle diameters and deflection of approaching vehicle paths. In comparison, the large diameters and tangential entrances of traffic circles produce higher speeds and greater speed differential among merging and weaving vehicles.

Roundabouts dramatically outperform traffic circles, as evidenced by the conversion of the former Los Alamitos Traffic Circle at the intersection of Pacific Coast Highway (State Route 1), Lakewood Boulevard and the Los Coyotes Diagonal in Long Beach. Minor modifications were implemented in early 1993 to introduce both yield control and greater deflection upon entry, but the large circulatory roadway diameter (143 m) was retained. Daily congestion was completely eliminated almost immediately and the intersection's peak period operation is still ranked as an "A" level of service with drivers experiencing an average delay of only four to five seconds.

First-time drivers and even passengers may experience stress as they navigate this hybrid roundabout. But this is mostly due to the high speed differential between circulating and entering traffic, a byproduct of a circle size more than 50 percent larger than recommended. What appear to be close calls and near misses actually are the basic, but faster-than-desirable traffic operations of a supersized roundabout. The average delays of four to five seconds would be unheard of at a traffic signal handling 60,000 vehicles per day, including morning and evening peak hour flows of up to 4,700 vehicles.



COMPARISON OF PREDICTED INJURY CRASHES FOR SINGLE-LANE AND DOUBLE-LANE ROUNDABOUTS WITH RURAL OR URBAN SIGNALIZED INTERSECTIONS

Simpler and Safer

Approximately 50 percent of all traffic collisions occur at intersections. Numerous research efforts have found that roundabouts experience collision rates and severity that are significantly lower than those of the intersection they replace. Research on U.S. sites by Persaud, et. al. found that roundabout conversions were responsible for "…reductions of 40 percent for all crash severities combined, and 80 percent for all injury crashes. Reductions in the number of fatal and incapacitating injury crashes were estimated to be about 90 percent."

Based on data from 23 sites, the researchers found the results to be consistent with numerous international studies. Most important, they suggest that" …roundabout installation should be strongly promoted as an effective safety treatment for intersections."

Improved safety is attributed to the conversion of all possible conflicting movements into a series of low speed, right-in/right-out turns. Not only is the number of potential conflicts reduced (from 32 to eight), but the most severe conflict types – direct crossing and left turn movements – are eliminated.

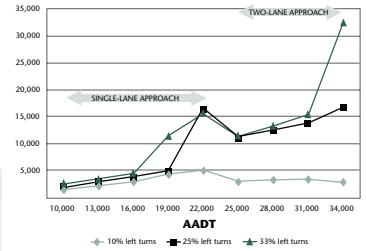
Roundabouts have fewer injury accidents per year than signalized intersections, particularly in rural areas. At volumes greater than 50 000 ADT, urban roundabout safety may be comparable to that of urban signalized intersections.

Slower *and* Faster

An equally impressive performance attribute is the travel time savings that roundabouts produce in comparison to all-way stop controlled and signalized intersections. The explanation is not very scientific, but is easy to understand when you consider the delay that accumulates when signals and stop signs force a driver to stop under light traffic flows. You must stop, whether or not another vehicle is approaching the intersection.

Under heavy traffic at a signalized intersection, a significant percentage of the total traffic comes to a momentary stop during each cycle. Technically, the "all red" clearance phase is partially responsible for this loss of capacity, but even the stoppage, queuing and eventual start-up time that accompanies every signal cycle can become a significant component of the total delay at a signalized intersection.

In comparison, intersections that rely solely on yield control allow each vehicle to enter as soon as the driver perceives an acceptable gap in the conflicting traffic stream. The smaller the gap, the higher the intersection capacity. With a single-lane roundabout, an extremely small short gap is acceptable to most drivers because they need only be concerned with low speed traffic circulating from left to right. This allows a driver to cut in front of a circulating vehicle without causing it to brake or swerve. If conflicting traffic is not present, the entering driver can navigate the intersection at the design speed of 25-29 km/h.



DELAY SAVINGS FOR ROUNDABOUT VS. SIGNAL, 65% VOLUME ON MAJOR STREET

The time savings measured in comparison to signalized intersections can be greatest at two-lane roundabouts, but still significant when single lane roundabouts operate in the upper range of their capacity (approximately 20 to 25,000 ADT).

When installed in tandem or series, roundabouts can produce secondary, traffic calming effects by reducing vehicle speeds. If some form of intersection control exists or is warranted—say, at either end of a town, business district, or Main Street—the use of roundabouts can contribute to the establishment of a more pedestrian-friendly environment. And this can be accomplished while reducing the overall travel time for all highway users, especially where yield controlled roundabouts are installed instead of traffic signals.

Other Highway Users

The continuous flow operation of the roundabout appears to favor motor vehicles over non-motorized highway users. Under heavy traffic flows, the absence of forced stops at roundabouts can leave children, the elderly and disabled persons without their preferred crossing condition. However, the roundabout can produce a highway environment that can enhance the mobility and safety of non-motorized highway users. The following design features are unique to roundabouts and create conditions that can be advantageous to pedestrians:

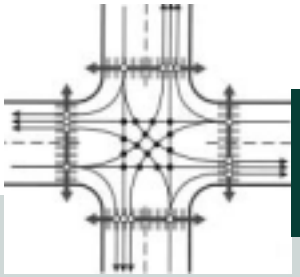
- Pedestrian-vehicle conflict points are separated from the vehicle-vehicle conflict points, allowing drivers to focus on the pedestrian crossing.

Pedestrian crossings are shorter and simplified by:

- Allowing users to cross one direction at a time (with the aid of a refuge island)
- Allowing users to cross as soon as they find a suitable gap in traffic
- Lower vehicle speeds prevail at pedestrian conflict points

Properly designed roundabouts will produce a range of vehicle speeds that have a much lower potential for causing severe injury or death to pedestrians than the speeds found at conventional crossing-type intersections.

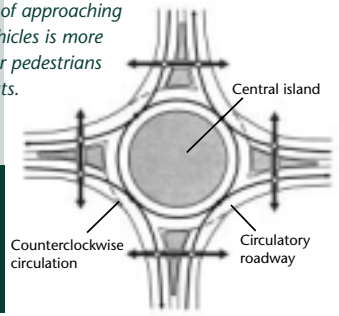
The distinction between a traffic circle and a roundabout may appear subtle to one driving through such an intersection, but the difference in performance is dramatic.



Vehicle-Pedestrian conflicts at signalized intersections

O Vehicle/Pedestrian Conflicts
● Vehicle/Vehicle Conflicts

The direction of approaching conflicting vehicles is more predictable for pedestrians at roundabouts.



Vehicle-Pedestrian conflicts at single-lane roundabouts

O Vehicle/Pedestrian Conflicts
● Vehicle/Vehicle Conflicts

In contrast with findings on pedestrian safety, international research has found that bicyclists may be subject to increased collision potential when navigating multi-lane roundabouts. As a minimum, the design of these higher capacity roundabouts must include features that provide at least two options or choices for a bicyclist encountering a roundabout.

Since the roundabout minimizes the speed differential between bicycles and motor vehicles, a more experienced bicyclist may prefer to mix with circulating motor vehicle traffic. Younger or less experienced cyclists may need facilities that allow them to navigate the roundabout as a pedestrian. Curb ramps leading from the approach roadway shoulder to wide sidewalks will provide these users with a means to navigate the roundabout using the same crosswalks as pedestrians.

Pedestrians with disabilities, particularly those with visual impairments, may find the circular geometry and traffic flows of the roundabout difficult to navigate without assistance. Unless acceptable design features and traffic control or warning devices are provided for such users, a roundabout may be considered inaccessible under the Americans with Disabilities Act. The Federal Highway Administration's technical publication: "ROUNDABOUTS: An Informational Guide," describes possible design treatments; however, most of these have not been tested for effectiveness in the U.S.

Applications & Opportunities

The decision to install a roundabout is actually a decision to use the least restrictive measure of traffic control available—that is, yield control. Therefore, each decision needs to be made with the same level of care and engineering analysis that is required prior to the installation of any common traffic control device.

Intersection control can have a tremendous influence on the presence, amount or absence of congestion, as well as the frequency and type of collisions likely to occur. Therefore, effective decisions should be based on two fundamental principles. First, the device or strategy must address a transportation need or traffic problem; second, there must be a reasonable assurance (derived through engineering analysis) that the control measure will produce benefits that outweigh the negative or side effects commonly produced by the control device. Foremost among the highway features and vehicle/driver characteristics that can produce such effects at roundabouts are high approach speeds, truck operations, constrained rights of way and older drivers. The FHWA's informational guide presents detailed discussion and technical advice on these and other critical topics and can assist in the determination and measurement of disbenefits.

A Step Back or a Leap Forward?

We don't know everything about roundabouts yet, so it is imperative that proposals and designs are properly evaluated. Design Information Bulletin (DIB) No. 80 describes the conceptual approval process for the installation of a roundabout at a state highway intersection. However, the decision-making process should rely upon the technical findings and opinions presented in the FHWA's recently published guide.

It would be instructive to compare today's concern, reluctance and even fear of the roundabout with the debate over the first traffic signals. Our culture once took a big step in trusting drivers to obey a machine's order to stop and wait. It shouldn't be too much to ask today's drivers to yield to a low speed and uni-directional stream of traffic and, if necessary, determine when a gap is large enough for them to enter or merge safely.

Based on research findings collected over a span of more than three decades, including 10 years of experience in the U.S., drivers have continued to demonstrate that they are willing, capable and even quick to adjust to the demands of the roundabout.

NOTE: The DIB, FHWA guide, recent research papers, the Wall Street Journal article and other valuable resources are all available at the Caltrans Division of Design Website, under "Manuals & Guidance."

Best Applications

Roundabouts may be considered as an alternative traffic control measure to existing or proposed traffic signals, all-way stop control and even two-way stop control . In addition, roundabouts have been used effectively to meet the following needs:

Safety

Roundabouts can reduce both the frequency and severity of collisions by substantially reducing the potential for high speed broadside and left-turn related collisions.

Secondary benefits on adjacent highway segments may accrue where speed reduction accompanies the installation of a roundabout (especially for pedestrians and bikes).

Capacity

Intersections are the first part of the highway system to reach capacity and become "bottlenecks"; therefore, road widening – even the partial widening that accompanies signalization can be avoided for years by the installation of a roundabout.

Operational Deficiencies

Less efficient forms of traffic control can produce greater delays and queuing that can block adjacent driveways and even road intersections.

Many old freeway interchanges feature inadequate spacing between ramp terminals or between ramp terminals and adjacent frontage road intersections.

Since roundabouts produce less queuing, the need for costly widening or the relocation of intersections to provide additional signal "storage" may be avoided by the installation of one or more roundabouts, or the combination of two, closely spaced intersections into one roundabout.

Unusual or Obsolete Highway Geometry

- Intersections with 5 (or more) "legs" or significant skew angles
- Traffic Circles
- Offset "T" intersections where left turn lanes are both located within the offset

Traffic Calming - Only within the appropriate context or environment

- When installed in series or at either end of a town, business district or Main Street
- At the interface between rural and suburban areas where speed limits change

Aesthetics

- As part of a gateway treatment to signify the entrance to a community

Context-sensitive solutions are a bit like holistic medicine. They treat the whole community instead of just the street or highway running through it. And a recent planning exercise in two small San Joaquin Valley towns illustrates how a community's lifeline must be considered in the context of its economic and social well-being.

"Planning a highway without considering what it does to the fabric of a community is like performing a heart bypass without considering the lifestyle that brought on the problem," says Steve Hoyt, a planner with the nonprofit Local Government Commission's Center for Livable Communities, which held a recent five-day planning session in the communities of Cutler and Orosi.

THE CUTLER-OROSI CHARRETTE

State Route 63 presents a wide-open passing opportunity while serving as the main street for Cutler and Orosi.

Although a drive through the neighboring San Joaquin Valley towns of Cutler and Orosi, about 25 km east of State Route 99 near Dinuba, yields an impression of tidy businesses and neatly-kept homes, they need help. Average unemployment is about 30 percent and, because the employment is mostly seasonal farmwork, the combined poverty level hovers around 75 percent. Cutler, according to Department of Employment statistics, is now the poorest community in California. Cutler's population is 96 percent Hispanic; Orosi's is 82 percent Hispanic.

Sewer and water deficiencies limit new development. Building codes are mostly observed in the breach. Overcrowded housing is commonplace. High unemployment rates and poverty levels go hand-in-hand with high crime rates.

Caltrans message boards, used to advertise the Cutler-Orosi charrette, were considered highly successful.

State Route 63 cuts through the two towns, mostly serving those traveling through them, rather than those living in them. While the speed limits on Route 63 range from 55-70 km/h, actual average speeds are over 80 km/h. This is particularly important because, due to their poverty and character of employment, Cutler and Orosi have a much higher percentage of pedestrian traffic than other communities of similar size.

Acting on a District 6 request and with seed money from the Great Valley Center, Tulare County staff applied for and received a Caltrans community-based transportation planning grant of $52,000 to attempt to make Cutler and Orosi more livable. The county proposed a charrette—meetings, workshops and design sessions involving the public and a skilled design team—to create a community vision.

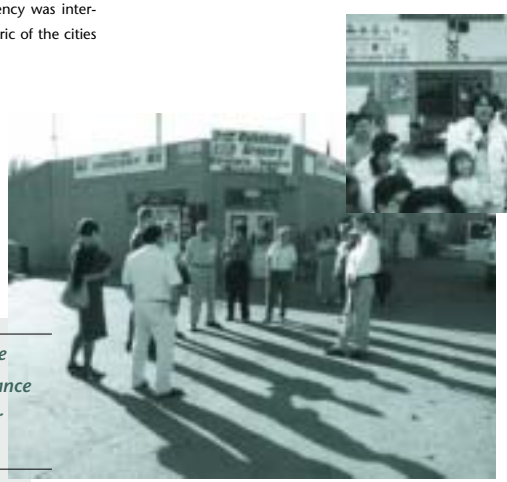
While Caltrans' interest primarily was in the future of Route 63, the county redevelopment agency was interested in how the economic and social fabric of the cities could be improved.

"The charrette is an excellent visioning tool," says Marta Frausto, who works in the District 6 Office of Transportation Planning. "It's a way for a community to develop a goal of what it wants to look like. This exercise gave Caltrans a step in the direction of what we could do to help them develop a sustainable community."

The Cutler-Orosi charrette, which took place over five days in November 2001, used focus groups, community walk-throughs, sleeves-up planning sessions and community meetings. It began with a large community meeting attended by 130 residents. Hoyt was surprised and delighted by the turnout, which was about double what had been predicted by most local observers.

"We had a great advance effort," says Jim Brown, manager of community development for Tulare County. "More than 500 invitation letters were sent by Community Services and Employment Training, Inc. Advisory committee members contacted community and political leaders. The school district sent flyers home with each student. Churches announced the charrette at Sunday services. Project partners provided music and food and conducted the charrette in English and Spanish. "Caltrans changeable message boards, set up on Highway 63 for a week, were very effective."

At the community kickoff meeting in the Cutler Elementary School cafeteria, local recreation center attendees watched a presentation that consisted of photographs of their towns and a narration outlining their strengths, weaknesses, opportunities and threats, as well



The Cutler-Orosi charrette gave ordinary folks a chance to help shape a vision for their two communities.

The county proposed a charrette — meetings, workshops and design sessions involving the public and a skilled design team — to create a community vision.

This exercise gave the community leaders and Caltrans a step in the direction of developing a sustainable, exciting community," says Marta Frausto.

as success stories from communities with similar challenges. They were given Post-It™ notes and asked to list their community's most important values. These values were later sorted by category and counted:

- **Family, togetherness, friends 35**
- **Community pride, culture, cooperation 30**
- **Safety and security 26**
- **Education, better schools 26**
- **Jobs, employment 17**

The participants were then asked to brainstorm what might be done to help the community conform to these values. Facilitators, working in both Spanish and English, kept a record. "The people really got a feeling of empowerment," says Steve Hoyt. His eyes shine when he says, "It was inspirational."

Local government was a key player in the Cutler-Orosi charrette.

The event was a success, partly because of its festive nature. Children participated; presentations were short, with long breaks to give participants time to eat, listen to mariachi music, visit with other community members and enjoy a chile verde dinner. Marta Frausto was especially impressed with the pattern of short presentations, then providing time for participants to walk around, discuss proposals, "air them out," and come back for more. "After three hours, people were still attentive and engaged," Frausto says. "That's a real contrast to more conventional hearings."

Participants were then invited to return the following day to get more specific about solutions to the two towns' problems.

On Friday, one-hour focus group sessions, varying in size from a dozen to several dozen attendees, were held with several separate groups: area 5th graders; representatives of the Chamber of Commerce, service organizations and the school district; church leaders; the County Resource Management Agency; residents of an affordable housing project, and with Caltrans District 6. The purpose was to determine solutions that were in the realm of possibility and, in particular, what Caltrans was willing to consider.

Facilitator Dan Burden, of Walkable Communities, Inc. and a leading expert on livable communities, invited participants to describe their concerns. Points that emerged were:

- **Traffic was too fast at street crossings.**
- **Development was hindered by water and sewer issues.**
- **People had to leave town to shop for many of their needs.**
- **Residents wanted more public space for recreation and gatherings.**

On Saturday, those participants who were most interested took part in a breakfast/training session, then performed a pedestrian audit along Route 63.

"Four schools are on or in very close proximity to Route 63," says Hoyt. "It would have been best if those participating could have watched the almost frenetic activity and potential for conflict between fast-moving cars and school kids as schools let out. But the group was able to identify problems and potential solutions. What they were doing was educating the design team."

A desire for safety, emphasized in the first two exercises, was again apparent as citizens identified a need for better lighting, sidewalks and streets. Streets and sidewalks emerged as a top concern. Activity centers, beautification, the commercial environment and housing were also priority areas.

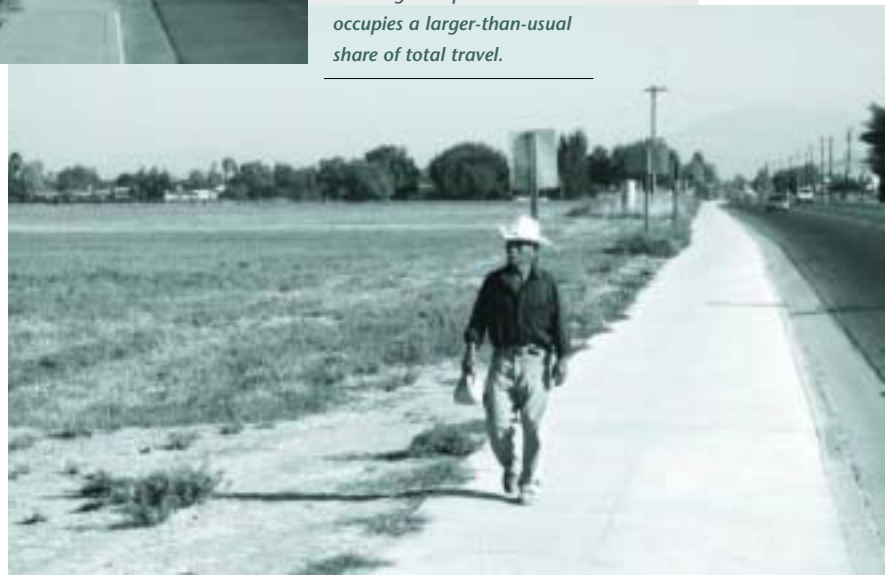
Next, the design team — consisting of two transportation planners, a traffic engineer, a landscape architect and an architect — went to work. They spent Sunday, November 4, and most of the following day analyzing government documents, observing the study area further and evaluating the values, needs and suggestions made during the charrette.

Working with digital photographs and PhotoShop™, they incorporated suggested solutions into Cutler-Orosi's streetscape. They took the comments of the agencies, including Caltrans, into account and prepared a presentation that showed the townspeople what could be accomplished with little or no funding. They also suggested medium-range and longer-term solutions.

Monday afternoon, traffic engineer Michael Wallwork presented the concepts to Tulare County Resource Management officials and Caltrans District 6 engineering and planning staff and Tulare County Supervisor Steve Worthley, who represents Cutler and Orosi. After Wallwork's presentation, he addressed questions and concerns regarding emergency vehicle access, street trees and medians.

Recommendations that could be implemented immediately included a series of actions that required little cost but had a high impact. Those requiring more time included

Impoverished farm workers who often get around on foot, represent a large segment of Cutler and Orosi's population, meaning that pedestrian travel occupies a larger-than-usual share of total travel.



"The people really got a feeling of empowerment," says Steve Hoyt. His eyes shine when he says, "It was inspirational."

interim safety and beautification measures such as sidewalk completion, curb extensions at critical crossings, roundabouts, street improvements and tree plantings.

In the longer-term vision was a truck bypass to move heavy trucks and commuter traffic to and from nearby Dinuba off the cities' main streets. Moving such traffic would allow creation of a pedestrian-friendly town center on vacant land between the two towns. A median, on-street parking, bicycle lanes and removal of two traffic lanes were recommended to calm traffic in the corridor.

On the fifth day of the charette, these solutions were presented at a second community meeting attended by 130 people, another unexpected but very favorable turnout. The facilitator provided visuals of proposed solutions, including amenities that could be installed on Route 63. "These were very powerful visual tools and they really opened peoples' eyes. We were asking, 'Did we hear you?'" says Hoyt. Audience members, asked to provide comments before the concepts were developed into a final vision, broke into spontaneous applause at several moments during the presentation. The consensus was that the conceptual plan represented a future that the citizens had envisioned for the community.

A top priority of the community was for changes to Route 63 to address pedestrian safety, especially of children. A safe, beautiful street would improve the community's commercial appeal and attract development. A truck bypass would enable vehicles, especially trucks and commuters, to avoid Cutler and Orosi.

"This amounts to a start for us," says Marta Frausto. "We still have a long and arduous planning process ahead of us. But we want to work with the community and to take actions that will help them produce a safe, walkable place in which to live. At the same time, we'll be remembering our responsibility for safety and inter-regional mobility."

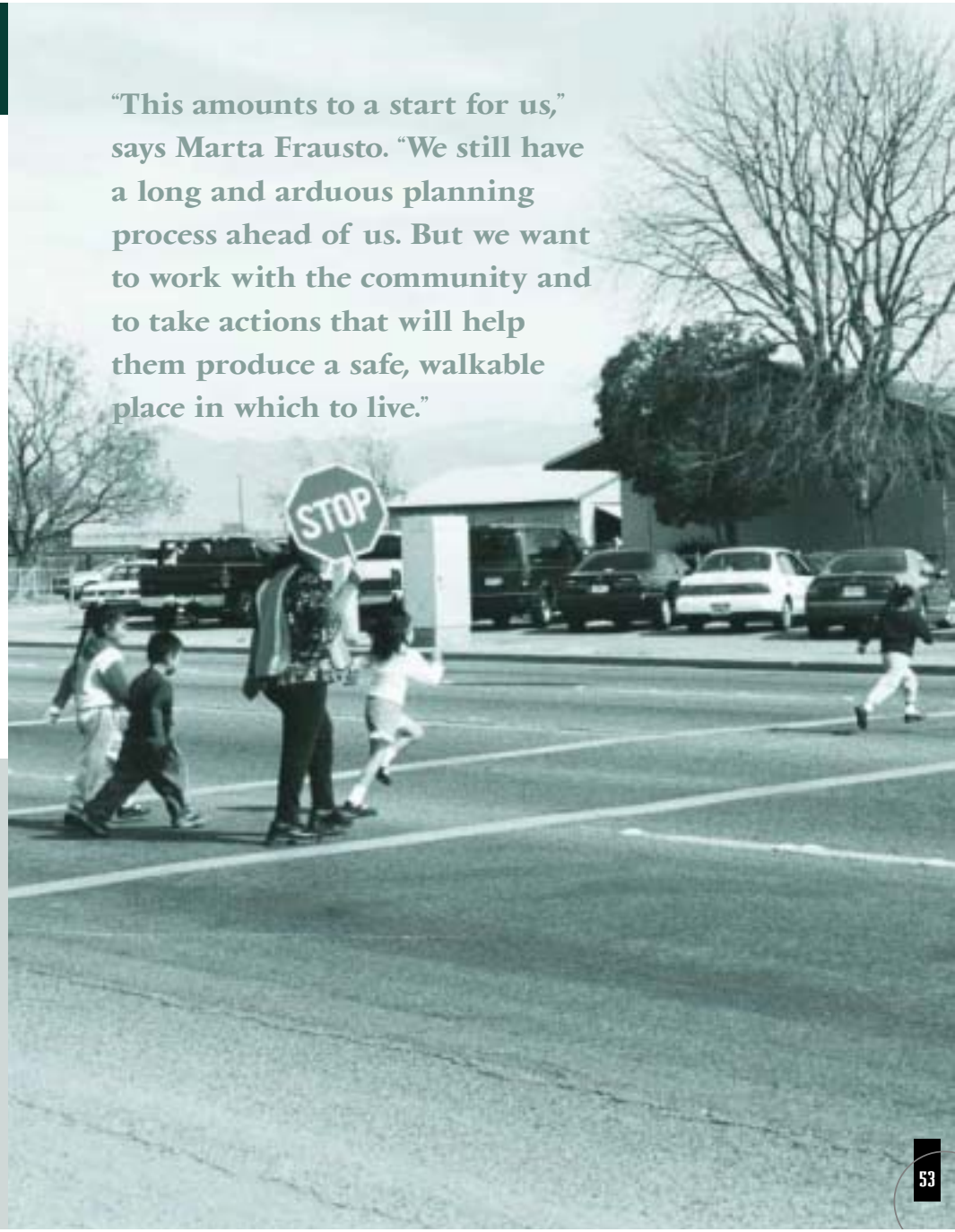
The Cutler-Orosi communities have limited financial assets for implementation. The communities do, however, have the most valuable asset of all — the commitment, skills and knowledge of their citizens. "These are the people who brought a charrette team to their small community," Hoyt says. "These are the people who turned out to express their views. And these are the people who have the power within to make their dreams become reality."

"People care about their town," Jim Brown says. "But it's often hard to engage them. The format of the charrette does that. It provides a framework for collaboration rather than confrontation."

For more information on the Community Based Transportation Planning Grant Program, please contact Leigh Levine in the Caltrans Office of Community Planning (916) 651-6012.

– Gene Berthelsen

A trip across State Route 63 can present a daunting task to a bicyclist or a pedestrian.



Horseshoe Pitchers Go for the Ringers

District 6 employees Frank Rodriguez and Ted Haynish know a ringer when they see one—a ringer in horseshoe pitching, that is. That's when a player throws the horseshoe at a stake some 40 feet away, and the "shoe," as they like to call it, encircles the stake, earning the player three points in tournament competition.

Ted Haynish

It takes more than a good throwing arm to pitch a ringer.

"Mentally, you have to be prepared," said Rodriguez, a highway electrician in Caltrans Maintenance in Bakersfield. "I practice every other day, about 100 shoes a day." He has a nice place to practice: a regulation horseshoe pit installed in his backyard. "I put in a $1,000 horseshoe pit. And I'm an electrician, so I put in a big light, so I can practice at night," he said.

Rodriguez, 42, a three-time class state champion (in 1991, 1995 and 2001) who has been competing for 22 years, has a lofty ambition: "My goal is to place in a world tournament." Before he makes that trip, Rodriguez says he's going to gain more experience in tournament play throughout the state. He competes about twice a month.

What's the appeal of the sport? Rodriguez says he likes "the competition, the overall sport. I love it. It's a whole lot of fun." Besides the competition, he also enjoys meeting all the competitors and their families. "It's one big family," said Rodriguez, who has worked at Caltrans for 14 years.

Rodriguez is ranked No. 1 in his local horseshoe pitching club, the Bakersfield Shoe Crew. And he has amassed more than 70 trophies, plaques and assorted winnings, including mugs, belts, caps, gift certificates and prize money. A frequent winner, Rodriguez has found a grip and a rhythm that works for him, which translates into a lot of ringers in competition. Rodriguez says he makes a ringer about every other throw: "I'm basically a 50 percent player when I get going."

Just a step behind Rodriguez is Ted Haynish, an assistant traffic engineer who has worked at Caltrans for 44 years. He works in Traffic in the Fresno investigations unit. Haynish has been pitching horseshoes since 1993 and competes about 20 times a year: "I get one out of three ringers. I'm in with the 30 to 40 percent ringer-throwers. Everything is based on a ringer—your ringer percentage," he said.

Haynish explained the basics of competition play, which is broken into divisions for men, women, junior boys and girls, seniors and elders: "Everybody throws together. You may play six or eight games in a tournament. Men throw from a distance of 40 feet (measured stake to stake on a two-stake court). Ladies and juniors throw from 30 feet," said Haynish, 66, who is a member of the National Horseshoe Pitchers Association. He belongs to the local club in Tulare.

Most of the tournaments are played outdoors, with the tournament season running from roughly February through September. Haynish and Rodriguez could end up facing each other in competition, as has happened in the past. Haynish said he has played against Rodriguez "probably half a dozen times" over the years. At the 2001 state tournament, Haynish made a good effort in their match-up. "I beat him that day. I might have been his only loss. But he ended up doing better in the tournament," said Haynish.

Frank Rodriguez

And who has the edge in 2002? Come September, the top ringer will tell the tale.

—Jane Sellers, Research Writer, District 6

Environmental Planner Brings Art into the Classroom

Kathy Ikeda

Third- and fourth-graders at one elementary/middle school in Stockton are enjoying some educational forays into the world of art, thanks to Kathy Ikeda, an environmental planner in District 10 (Stockton). Ikeda combined her love of art with her wish for better art education in public schools to become an art docent for her children's classrooms at Elkhorn School in Lodi Unified School District.

"I've been doing this for four years now, ever since my son Justin was in first grade. He's in fourth grade now, and my daughter Andrea is in third. I'm a docent for both of their classes. I try to stay on a once-a-month schedule with my presentations," said Ikeda. She is committed to the program and contributing her efforts to the educational process.

"My son's first grade teacher was the person who encouraged me to become an art docent, and I've come to really love being part of the program. So much focus is placed on 'the basics' in school now, but I feel very strongly that the arts are an important part of a well-rounded education, and this is one way I can ensure that kids get that exposure. Plus, they get such a thrill out of the program, and really look forward to each presentation," she said.

> "My son's first grade teacher was the person who encouraged me to become an art docent, and I've come to really love being part of the program."

The art docent program, coordinated through the school's district headquarters, provides various themed art portfolios that contain five to 10 poster-sized color reproductions of artists' works. The portfolios contain art by well-known painters such as Van Gogh, Renoir, Monet, Picasso, Dali and Matisse, but also artwork by less widely known painters, sculptors and artists.

"Each board has a description of the particular piece and some information about the artist mounted on the back, so it's easy to refer to when making a presentation. We also have grade-specific art docent booklets that have mini-reproductions of the pieces in each portfolio, including descriptions. For each themed unit there is a suggested art project, although I often invent my own," Ikeda explained. "It generally takes me around half an hour to present and discuss the pictures with the kids, and then an hour to do a related project afterwards."

The art projects can be something as simple as drawing a picture or something more involved or detailed, depending on the docent's creativity and planning.

"I recently presented the 'Japanese Art' series to my daughter's class, and afterwards I led everyone through making origami paper cranes. I also prepared a handout that briefly explained the history of origami and the significance of the crane as a symbol of good luck. So that unit was a lot of fun," said Ikeda.

Her part-time schedule at Caltrans allows Ikeda time for the school activities.

"When I returned to Caltrans four years ago, after being a full-time mom for six years, I requested a part-time schedule — 24 hours per week. So now I work Monday through Thursday and then have Fridays off to be involved at school. It's ideal for me," she says.

— Jane Sellers, Research Writer, District 6

Truly Unruly Yours

You probably know plenty of equipment operators who operate backhoes, front loaders or dump trucks, but how 'bout a BattleBot?

"Timmy" at rest and in the arena.

District 10 Permits Engineer Steve Waldron, a 28-year Caltrans veteran with roots in Maintenance as a landscape leadworker, is used to operating all types of machinery, but lately his equipment is of a different kind. He builds radio-controlled fighting robots, a.k.a. "BattleBots," and pits them against other battling robots.

When Steve's son, John, and friend Mike Hertzig recently needed a partner to help build and fight the robots, the permits engineer became a part of "Team Truly Unruly."

It took eight months and plenty of creativity, skill and tactics for Team Truly Unruly to design, build and prepare its entrants. In November of 2001, the team took its bar aluminum and steel fighting robots, Ack-Ack and Timmy, to Treasure Island in the San Francisco Bay to qualify for the airing of Comedy Central's popular BattleBots show, which airs Tuesday nights. Timmy had two wins and one loss, achieving a ranking of No. 22 in the U.S., which guaranteed it airtime on the BattleBots show.

Ack-Ack, running on two Power Wheels motors and armed with "flipper" and "spike" weapons, battles in the lightweight division. It positions its flipper beneath an opponent to flip it over or hurl it into one of the arena's hazards and uses its spike to deliver armor-piercing blows.

Timmy, powered by two 40-volt wheelchair motors, competes in the middleweight division and, true to its Caltrans heritage, uses something like a 'dozer blade to push other robots into killer obstacles in the arena.

The Bots compete against each other for a chance to win cash prizes and the "Golden Nut," a lug nut-shaped trophy. The battles take place in a steel-encased arena specially made for competition. The arena is rigged with traps and hazards such as slicing and dicing kill saws, pounding pulverizers and record playing vortex robot disrupters. They can be entered in one of four divisions — light, middle, heavy and super heavyweight, each with cash prizes ranging from $8,000 to $10,000. Cash prizes are also given for the coolest, best-engineered, most aggressive and best-driven robots. Team Truly Unruly hasn't won any money yet, but does have "the satisfaction of competing with fellow pioneers in a new and expanding sport," said Waldron.

In competition, robots need three things — an effective weapon to tear a challenger apart, a strong armor skin and traction to move effectively about the arena. All of this costs money. Drive motors cost $800 each. Lexan and treated titanium armor costs $40 per square foot. Radio control starts at $350. Each robot contains three or four motor controllers that cost approximately $180 each. Some teams have large sponsorship deals with robot-related suppliers, such as welders or radio control companies. A $60,000 sponsorship is not unusual for the top teams.

Steve Waldron's Team Truly Unruly has no such sponsor. "We were lucky to obtain wheelchair motors from a dealer for free," Steve says. "The owner had seen BattleBots and wanted to be a sponsor." Timmy cost Team Truly Unruly $1,500 in addition to $1,600-worth of free motors. Ack-Ack cost $900. The team pays for the robot's parts—batteries, sheet metal, motors, etc.—out of its own pockets.

—Stacy Dukes, Assistant Public Information Officer, District 10

Caltrans Engineer shows stuff as a U.S. Congressman

During the day, Alan Murphy is a Specifications Engineer for Caltrans District 3 in Marysville, writing engineering specifications for "Minor A" projects, such as freeway ramps, culverts and rock slope protection.

But for one day last December, Murphy became a U. S. Congressman, debating the escalation of U.S. involvement in the Vietnam War. He will appear in an upcoming Home Box Office (HBO) movie "Path to War", which stars Alec Baldwin as then-Secretary of Defense Robert McNamara and Donald Sutherland as Clark Clifford.

Alan Murphy

Murphy's chance for celluloid fame came when a friend in the business thought he would be perfect as an extra for a scene that features a debate at the United States House of Representatives in the nation's capitol. Instead of Washington D.C., the scene was shot in the Senate chambers of the California State Capitol in Sacramento, which, after some movie-set magic, was transformed into a reasonable facsimile of the real thing.

Murphy, appearing in his first feature film, received the full "Hollywood" treatment. After two hours in wardrobe and makeup, he was transported back to 1966 with a thin dark tie and a greenish-brown Botany 500 suit. "They did let me wear my own shoes," adds Murphy, whose taste in footwear is "retro".

Unbeknownst to the filmmakers, this bit of casting contained more than a trace of irony. The decisions portrayed in the film had a direct impact on Murphy's young life. He was only 20 when he arrived in Vietnam in 1968 as a member of a U.S. Army Engineering Battalion. His previous Special Forces training sent him on at least one temporary assignment behind enemy lines.

"I still can't talk about it 34 years later without having to kill you afterwards," Murphy jokes. "I can tell you that I am one of very few army engineers who earned a Combat Infantryman's Badge."

Murphy has better memories of his film shoot. "My scene," Murphy says, "is one where President Lyndon Johnson (played by Michael Gambon) addresses the House. Unless I end up on the cutting room floor, I'll be recognizable to people who know me."

Murphy says it took 14 takes before director John Franken heimer declared it a "print". Overall, Murphy was impressed. "Watching professionals like Baldwin and Frankenheimer work was fascinating," he says. "In fact, everyone connected with the production was considerate and professional."

Especially Baldwin, the film's marquee star. During a break in the shoot, Murphy said some of the "wanna-be" extras mobbed Baldwin in a hall. Baldwin politely excused himself and made his way to Murphy, who was standing alone.

"You mind if I talk to you for a minute?" Baldwin whispered. "I'm trying to avoid those guys."

"Of course," replied Murphy, who jokes that "he hit me at a good time." He graciously rescued the star by engaging him in innocuous conversation. "We talked just like a couple of regular guys", says Murphy, who resisted the temptation to ask for Baldwin's autograph.

— Mark Dinger, District 3 Public Information Officer

Above and Beyond the Call of Duty

Almost every duty statement in the department has a line that reads "and other duties required," but Greg Cooper, East Tree Crew, and Dale Bellavance, West Tree Crew, in District 11, recently went far beyond that catchall line.

On December 5, 2001, while working near the interchange of Interstate 8 and State Route 79 near Pine Valley in San Diego County, Greg and Dale came to the aid of a motorcyclist who apparently was following too closely behind a tanker truck that was leaking some of its 30,000 liters of Naphtha, a highly toxic, volatile gasoline additive.

Greg Cooper and Dale Bellavance

A faulty valve on the truck had created a leak and a trail of toxic vapor. The vapor caused a high degree of eye irritation and shortness of breath to the motorcyclist, who had been forced off the road. Dale went to his aid by washing his eyes with water while Greg took the necessary steps to keep travelers away by closing the right lane of westbound Interstate 8 as well as the on-ramp from State Route 79.

Greg and Dale called for other Caltrans workers and the local fire department, California Department of Forestry and the Highway Patrol, which arrived on the scene in response. The motorcyclist was removed by ambulance, taken for medical treatment and released.

Greg and Dale should be commended for their quick thinking and for using the skills and knowledge they obtained from the tailgate safety meetings and first aid classes that are mandatory for Field Maintenance Employees.

People

Awards

Marvin M. Black Partnering Award

The Associated General Contractors of America, at its 83rd Annual Convention in Las Vegas in March of this year, awarded the prestigious Marvin M. Black Partnering Award to Caltrans and two of its contracting partners, C.C. Myers, Inc. and Granite Construction Company. This award is a first for Caltrans and particularly notable because it is the first time since the award's introduction in 1992 that AGC has included a contracting agency as a recipient.

The partnering award, which uniquely rewards the process over the product, is a highly desirable attainment in construction and engineering for transportation projects. Judges consider the cooperative activities in a project's completion in addition to its size and scope.

Partnering is a way of conducting business in which two or more organizations commit to mutual goals, sometimes requiring moving from adversarial relationships into team-based ones. Partnering promotes open communication, trust, understanding and teamwork. It produces real business results, which include reduced total project costs and delays, safer products, higher quality, increased job satisfaction and prompt mitigation and resolution of claims.

Granite Construction Company formed a unique partnership with Caltrans and the Torres-Martinez Desert Cahuila Indians to complete the Mecca projects on State Route 86 and, in so doing, produced a safety record of 183,508 work-hours with no injuries or time lost while saving almost $700,000. The partnering team included Caltrans' Tom Olsen, Greg Ellis, Romano Verlengia, Denise Sostom, Nader Irhiyel, Chi-Ah Kim, Henry Stultz, Basen Alsamman, John Caron, Mostafa Kattaa, Hien Yu, Gon Choi and Granite Construction's Mike Wills, Jay McQuillen, Jim Larkins, Aaron Terry, Drew Erickson, Randy Dewey, Kurt Hindman, Adolfo Cacho and Maria Mirelez.

C. C. Meyer, Inc., Caltrans and Bay Cities Paving and Grading, Inc. completed the Highway 92 widening project in Hayward with a safety record of 94,499 work-hours and no reported injuries or time lost, saving $1.8 million on a $30 million contract. The partnering team included: Caltrans' Rodrigo Macaraeg, Vijay Sayal, Andrew Fremier, Moin Shaikh, Bhoopen Kurani, Ramin Abidi, Dan Brodnik, Patrick Treacy, Casimiro Bautista, Mond Osawaru, Shirley Richard, Mark Zabaneh, Steward Lee, and Lenka Culik-Caro. The C. C. Myers team was made up of Gary Janco, Mike Loustalot, and Dwayne Barth; and Bay City Inc.'s Ben Rodriquez Jr., Erick Barker, Mike Llamas, Jack Wu, Steve Caudill and Kevin Barker.

A Tranny for Satish

The California Transportation Foundation's Manager of the Year is Satish Chander, chief of Caltrans District 7 Local Assistance for the past nine years.

He was nominated for the annual Tranny's nod to managerial excellence by the County of Ventura and the Los Angeles County Metropolitan Transportation Authority.

In the local agencies' summary of Satish's abilities, Ginger Gherardi of Ventura County and David Yale, of the transportation authority, said, "Satish and his staff have done an outstanding job assisting local agencies in moving their projects forward. They have been pro-active in training staff on Caltrans processes, addressing problems as soon as they occur and resolving issues on projects that are "out of the box."

Satish Chander

Satish and his staff have been particularly effective in addressing the increase in funding due to the adoption of TEA 21 and the timely use of fund requirements under AB 2928.

District 7 was pro-active in reviewing the two counties' funding balances and working with them to ensure that projects were submitted to obligate funds well in advance of the AB2928 funding deadlines. In addition, Satish has often taken the initiative to ensure that local staff understood the process before they submitted projects.

Thanks to the efforts of Satish and his staff, both counties obligated all their funds far in advance of the AB 2928 deadlines. In fact, this past year, District 7 obligated $331 million in Los Angeles and Ventura counties for Local Assistance, or about 130 percent of the annual apportionment of the two.

In their recommendation, the two counties said, "Satish, in particular, has been respected for his strong professional integrity and commitment to transportation. Project sponsors have been highly appreciative of his willingness to step forward and deal with projects that do not fit into typical categories. This has made it much easier to deal with Caltrans and get projects moving."

After more then 35 years of Caltrans service, Satish retired in December 2001.

A Tranny for Laurie

In most award scenarios, members of the audience sit on the edges of their seats, awaiting the opening of a white envelope holding the name of the winner. In this one, nominees are up for the California Transportation Foundation's most prestigious awards—the Trannies.

Great awards need a unique and catchy name. Actors and actresses get Oscars, recording artists get Grammies and transportation has its Tranny Awards, which annually recognize outstanding transportation achievements in California.

This year's selections have been announced and the Tranny Supervisor of the year award goes to...Laurie Barton, District Local Assistance Engineer, of Caltrans District 10, Stockton.

Laurie Barton

The Stanislaus Council of Governments nominated Laurie and her team for delivering projects on off-system county roads and local streets. Laurie and her team currently are working on 381 active projects totaling $240 million, including the $47 million UC Merced Transportation Congestion Relief Program project. "We are using quality customer service tools of listening, evaluating and analyzing to ensure timely delivery of local projects," Laurie says. "Our goal is to deliver 100 percent of our projects by partnering with our Local and Resource Regulatory Agencies."

Laurie's team received its Tranny for a comprehensive set of activities to improve local project delivery. They developed and maintained a comprehensive quarterly project tracking system to monitor project delivery from programming through final invoicing. They also worked out a pre-programming project review procedure and strategies to help local agencies deliver projects. They initiated two customer service surveys to gauge their own work performance, potential process improvements and new ways to partner with local agencies. To improve personal and professional relationships among regional, local, federal and resource agencies and Caltrans staff, the team hosted a district-wide team building meeting.

Laurie's supervisor, District Deputy Director Dana Cowell, feels the district is fortunate to have a person of Laurie's talent, dedication and people skills. "She is very deserving of the Tranny! Yeah, Laurie!"

Debra Whitmore of the Stanislaus Council of Governments, the agency that nominated Laurie, says, "Under Laurie's leadership, this group of talented professionals goes the distance to serve local agencies and is willing to pursue initiatives that may ultimately show the entire state how to get the job done right."

The first Trannies were presented at an Institute for Transportation Studies Conference in Redwood City in 1990. These days, the awards are presented annually in Sacramento during the foundation's May evening meeting.

Nominations are taken during an open process in January and February with a March 1 deadline each year. The selecting juries consist of foundation board members and other invited transportation professionals.

Laurie Barton was thrilled to have been selected as a Tranny recipient, but lauds the support of her staff for its superior customer service.

Laurie's staff returns the favor. "I'm glad she was my first supervisor because she is supportive, resourceful and nurturing to us," says Everglean Parado, Transportation Engineer. "Laurie is a mentor who encourages us to succeed, both in personal and career goals."

– Stacy Dukes, District 10 Information Officer

Awards

Editor's Notebook

Numbers, Numbers

State Route 1 traces the length of California's coast. State Route 2 lies mostly in Los Angeles County. To drive on Route 3, you have to go all the way to the top of the state: Siskiyou and Shasta counties.

Route 4 slices across from the San Francisco Bay to the high Sierra. Everyone knows about Interstate 5, running the length, not only of California, but of Oregon and Washington as well, but who ever heard of Route 6? It's only a little more than 50 km long, all of them in Inyo County.

Route 7 used to be the Long Beach Freeway, but that route was taken into the Interstate System a few years back and renamed as 710. These days, Route 7, commissioned in 1994, provides a new port of entry between Mexico and California in the Imperial Valley.

Interstate 8, of course, is a biggie, roaring off to the east out of San Diego, while Route 9 is a quiet little country road down the backside of the Coast Range in the San Francisco Bay Area. Interstate 10 is another of those brawny Interstates; it'd take you all the way to Jacksonville, Florida, 3959 km, if you wanted to go that far.

Your editor hasn't traveled all of California's highways, but we've managed a lot of them, and there's always a surprise or two down the road. But those numbers: where do they come from, and who decides?

Local officials originally gave California's highways their first numbers, resulting in duplication and mass confusion, so the California Auto Club, the state Legislature and the California Highway Commission did their best to bring order out of the chaos. Then, in 1926, the American Association of State Highway Officials, finding an irrational, nationwide patchwork, did its best to come up with a rational system.

"U.S." 95, described elsewhere in this magazine, got numbered under that system, the precursor to the Interstate System. Some of the "U.S." highways got left out of the Interstate System, and for some reason we still call them that, instead of just State Routes. The massive renumbering, brought about by the inauguration of the Interstate System in 1956, is the one we live with today.

Route 66: Still there.

"State Route," by the way, is the correct terminology, as in "State Route 1," as opposed to "Highway 1."

You might think that anything made of asphalt and concrete, like California's road system, would pretty much lie there and not change, but it does. Every time Caltrans straightens out a curve, it shortens the road. Cities and counties take over portions of highways, or we take them over. Sometimes, we even build new ones.

Then it falls to Navneet Singh and his staff in the Division of Transportation System Information to come up with a new legislative description and, if necessary, a new number, to be blessed by the state legislature as part of the California Streets and Highways Code.

As for California's arguably most famous route, yes, there still is a State Route 66 where you can get your kicks, but it got pretty much trashed when Interstate 40 was built. Still, an old romantic might want to find a '66 Corvette and take a ride on it. It exists today mostly as back roads and city streets rather the transcontinental pipeline that pumped millions of new residents into California in the '30s and '40s. Tom Joad would never recognize Route 66 today but, on the right street corner, in front of the right funky motel, the romance is still there.